AUG 27 2004

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Food Guide Pyramid Reassessment Team
USDA Center for Nutrition Policy and Promotion
3101 Park Center Drive
Room 1034
Alexandria, VA 22302

FR Doc. 04-15710

August 26, 2004

Dear Dr. Hentges and the Food Guide Pyramid Reassessment Team:

The greater than 67,000 members of American Dietetic Association commend your transparent approach to reviewing and revising the USDA Food Guidance System. ADA strongly supports making decisions based on sound science and is pleased to participate in the review of your proposed system.

The answers to each question proposed in the Federal Register is discussed in detail below. However, the ADA wishes to highlight the following points.

- The shape of the Pyramid should be maintained – it is not the shape but rather the content and accompanying education messages that require updating.
- The Food Guide Pyramid should not be a stand-alone education tool.
- Education strategies should be market tested with diverse audiences. The results of that research should be announced via the Federal Register and/or peer-reviewed publications, and public comments should be sought.
- The Food Guidance System should focus on health promoting strategies. People with special nutrition concerns should be encouraged to seek medical nutrition therapy from dietetics professionals.
- USDA should begin now to establish the process to systematically evaluate the existing and new evidence to support the Food Guide Pyramid. The goal is to have this analysis available when the next revision is needed. A conceptual framework and process to evaluate peer reviewed published research is essential for the pyramid to reflect current scientific understanding on this topic.

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ADA concurs with the Food Guidance System's underlying nutrition messages: adequacy, variety, proportionality, and moderation. Together with its guide, the Food Guide Pyramid was to promote health based on up-to-date research to meet nutrition goals in a realistic manner while allowing for maximum flexibility so that it could be practically implemented by its target audience. The graphic is now widely recognized and valued but not well understood. The focus of this revision process should be to improve consumer understanding and application of the underlying nutrition messages.

What are the advantages and disadvantages of retaining current shape for graphic and other potential shapes?

The shape of the Food Guide Pyramid was not an arbitrary decision but rather the result of multi-million dollar research in the late 1980's. The research explored many alternative shapes and looked for the graphic that best communicated variety, proportionality, and moderation to the target audience: adults with at least a high school education who ate a typical American diet. The graphic had to be reproducible in many sizes and in both color and black and white. The Pyramid was chosen because it best met each of these criteria[1]. To date, no research has been done that contradicts that conclusion. In addition, the Food Guide Pyramid is one of the most widely recognized and widely distributed nutrition education tools in the United States.[2] **Thus, the Pyramid shape should be retained.** The messaging within and accompanying the shape needs to be updated to reflect current science and improve consumer understanding, but abandoning the shape would only further complicate the process.

What is the usefulness of the proposed strategies to highlight both motivational/awareness and educational messages?

The range of strategies described in Section III of the Federal Register has the potential to be effective. Making them effective will require considerable market testing with diverse audiences in order to ensure that the graphic, slogan, and core messages do, indeed, communicate what is intended to those for whom it is intended. For instance, encouraging people to 'promote nutrient dense food choices' is healthy advice, but may mean nothing to most consumers. Determining what language best communicates to consumers is at the core of effective consumer messaging and thus, these strategies are entirely dependent on that process.

Given the importance of the consumer research in making these messages relevant and effective, ADA suggests that the consumer research results be made public and available for comment via the Federal Register and/or published

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[1] Welsh S, Davis C, Shaw A. Development of the Food Guide Pyramid. Nutrition Today. Nov/Dec 1992; 12-23.

[2] Goldberg JP, Bellury MA, Elam P, et al. The Obesity Crisis: Don't blame it on the Pyramid. JADA 2004, 104(7): 1141-1147.

in peer reviewed journals. Continuing with the transparent and evidence based approach to Food Guidance development beyond this comment period is paramount not only to creating the best outcomes but also to maintaining the process's credibility.

In addition, USDA may want to consider health care professionals as an additional target audience for communication, interactive programs, and print materials. Development of more complicated concepts, such as nutrient density, best starts with health care professionals. Educating health care professionals on more complicated points may allow them to better communicate basic principals and their application to their clients.

Advantages and disadvantages of the plan to individualize guidance in contrast to "generalized" messages?

The graphic, slogan, and core messages should be applicable to all consumers. The basic principles of adequacy, variety, proportionality, and moderation are the basics of a healthy diet regardless of age and health status. In addition, the basic points highlighted by past versions of the Dietary Guidelines are also universally applicable: Eat a variety of fruits and vegetables, choose more whole grains, moderate fat, sugars, and sodium intake, and balance energy input with energy output. What varies among people are the specifics of what and how much to consume. Thus, the major points such as 'choose lean dairy products' are useful general messages. The specifics of whether to have 2, 3, or 4 servings a day, or whether to take a calcium supplement, or to consume high calcium dairy alternatives if you dislike dairy products, should be individualized via print or electronic materials.

According to NHANES data, almost 65% of adults are overweight or obese and over 15% of youth are overweight[3,4]. Therefore, any public health nutrition campaign should take into account the specific needs of overweight and obese populations. However, much of what is healthy for those who are overweight or obese is also healthy for the population as a whole. Because obesity is caused by over consumption of calories relative to energy expenditure, public health guidance should encourage people to moderate calories and increase physical activity as appropriate to maintain or lose weight. However, the guidance should not be universally in favor of weight loss as weight loss is not appropriate for everyone. However, it would be advisable to include weight loss guidance for the large subset of the population who is seeking such information.

[3] Health, United States, 2002, table 70: Healthy weight, overweight, and obesity among persons 20 years of age and over, according to sex, age, race, and Hispanic origin: United States, 1960-62, 1971-74, 1976-80, 1988-94, and 1999-2000.

[4] Health, United States, 2002, table 71: Overweight children and adolescents 6-19 years of age, according to sex, age, race, and Hispanic origin: United States, selected years 1963-65 through 1999-2000.

Thus, the core messaging must focus on the highlights that apply to everyone (of various body sizes, ages, etc.) such that at the minimum people get the basic messages they need to be healthy. Specifics beyond those basic messages can then be targeted at specific populations so long as the messages are still within the realm of 'healthy' and not 'therapeutic' nutrition advice. Therapeutic advice needs to be tailored to each individual and would not be appropriate for a public health campaign. People with special medical concerns such as those with diabetes, heart disease, or eating disorders require medical nutrition therapy by dietetic professionals in order to address their complex nutrition needs. To ward against public guidance being seen as a substitute for therapeutic intervention, public nutrition guidance should include a tagline analogous to those on over the counter medications that encourages consumers to see a health professional, such as a Registered Dietitian, for more information or if health concerns persist.

Advantages and disadvantages of the planned focus on core messages in contrast to use of a graphic to represent educational messages?

According to the 1997 ADA Nutrition Trends survey, two thirds of people recognized the Pyramid and almost half of them considered it valuable[5]. More recent Gallop studies done for the Wheat Foods Council have not only confirmed that finding but have shown that recognition is growing with 75% of people recognizing the Pyramid in 2000[6]. Yet, according to the 1999-2000 Healthy Eating Index, only 16% of Americans eat what is classified as a "good" diet such as the Pyramid represents[7]. This incongruence is symbolic of the current problem with the Food Guide Pyramid: most people recognize it but few people understand it and almost no one adheres to it.

A prime example of consumer misunderstanding is the size of a serving. The 2002 ADA Trends survey asked people to identify correct serving sizes for different foods. With the exception of bread, the majority of consumers could not correctly identify the recommended serving size of foods. With very few exceptions, consumers perceive serving sizes to be larger – and often considerably larger -- than that recommended by the Food Guide Pyramid.

Eating is a complex behavior with biological, environmental, social, cultural, and behavioral interactions. No one nutrition education tool could be expected to significantly affect such a multifaceted behavior. Unfortunately, the Pyramid is often used as a stand-alone nutrition education tool in ways that were never intended. Illustrations such as the Pyramid are best used as part of nutrition education programs and curriculums that focus on the total diet. Several studies have shown that nutrition education that focuses on the total diet is effective in

[5] Nestle M. In defense of the USDA food guide pyramid. Nutrition Today 1998; 33: 189-197.
[6] Wheat Foods Council. National Gallup Survey Summary: Going Against the Grain. Parker, Co: Wheat Foods Council; 2001.
[7] Basiotis PP, Carlson A, Gerrior Sa, Juan WY, Lino M. The Healthy Eating Index: 1999-2000. Washington, DC: US Dept of Agriculture, Center for Nutrition Policy and Promotion, CNPP-12; 2000.

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improving health outcomes such as BMI, blood pressure, and blood lipid levels[8],[9]. And according to CSFII data, individuals with Pyramid-based dietary patterns have lower BMI's than those with non-Pyramid based diets[10]. Therefore, the revised Food Guidance System should incorporate the graphic into a larger system of total diet education that includes core messages and strategies for implementation.

Key Components for Effective Interactive Educational Tools

Several studies have shown that tailored interactive nutrition education is more effective in changing attitudes and behaviors than general messaging[11] [12] [13]. Components of effective programs include a strong theoretical framework, ongoing coaching, and tailored behavioral feedback. Many interactive models have included personal interaction such as peer support groups, professionally facilitated discussions, and professional personal feedback that is likely beyond the scope of CNPP's current efforts, but could be offered via other organizations as a complement to CNPP's work.

The greatest barrier to effective on-line interactive nutrition education is access to the electronic medium. Interactive programming is most easily and economically conducted via the Internet and thus requires both access to and understanding of the web. Unfortunately, populations most at risk for poor nutrition, such as those at lower economic levels and the elderly, also have limited access to the web and limited computer literacy. However, this obstacle could be overcome via creative partnering with locations such as grocery stores, libraries, doctor's offices, and schools who could provide kiosks or other types of web access and assistance. For instance, a Virginia Tech study demonstrated significant success with a 15-week nutrition intervention done via grocery store kiosks[14].

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[8] Gambera PJ, Schneeman BO, Davis PA. Use of the Food Guide Pyramid and US Dietary Guidelines to improve dietary intake and reduce cardiovascular risk in active-duty Air Force members. Journal of the American Dietetic Association, 1995(95):1268-1273.

[9] Appel LJ, Moore TJ, Obarzanek E, Vollmer WM, Svetkey LP, Sacks FM, Bray GA, Vogt TM, Cutler JA, Windhauser MM, Lin P-H, Karanja N. A clinical trial of the effects of dietary patterns on blood pressure. New England Journal of Medicine. 1997; 336:1117-1124.

[10] Goldberg JP, Belury MA, Elam P, Calvert Finn, S, et al. The obesity crisis: don't blame it on the pyramid. JADA 2004; 104(7): 1141-1147.

[11] Kristal AR, Curry SJ, Shattuck AL, Feng Z, Li S. A randomized trial of a tailored, self-help dietary intervention: the Puget Sound Eating Patterns study. Preventative Medicine 2000; 31(4): 380-390.

[12] Oenema A, Brug J, Lechner L. Web-based tailored nutrition education: results of a randomized controlled trial. Health Education Research 2001; 16(6): 647-660.

[13] Brug J, Steenhuis I, Van Assema P, Glaz K, De Vries H. Computer-tailored nutrition education: differences between two interventions. Health Education Research. 1999; 14(2): 249-256.

[14] Anderson ES, Winett RA, Wojcik JR, Winett SG, Bowden T. A computerized social cognitive intervention for nutrition behavior: direct and mediated effects on fat, fiber, fruits, and vegetables, self-efficacy, and outcome expectations among food shoppers. Annals of Behavioral Medicine 2001: 23(2): 88-100.

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Channels of Delivery for the Food Guidance System

According to ADA's 2002 Nutrition Trends Survey, Americans' two primary sources for nutrition information are television and magazines. Although the Internet's role is growing, in 2002 only 13% of people surveyed considered it their primary source of nutrition information[15] - up from 6% in 2000. Thus, the new Food Guidance System will have the greatest impact if it is not only available via interactive web sites, but is also incorporated into or at least referenced by mainstream media. Incorporating the Food Guidance System into mainstream media will require a significant marketing and education campaign beyond what is on the web including working with professional associations, journalists, and television and magazine producers. Incorporating the messages of the Pyramid into or referring people to available web tools via mainstream culture including programs people are already watching and magazines they are already reading will multiply the impact of the new system by maximizing the reach.

The good news is that people are increasingly interested in nutrition and health. The 2003 nutrition trends survey indicated that 85% of people consider nutrition important to them personally and 75% say they carefully select foods in order to achieve balanced nutrition and a healthful diet. 58% say they actively seek information about nutrition and healthful eating. And when people seek nutrition information, their most trusted sources are doctors, registered dietitians, and other health care professionals[16]. Thus, working with professional associations such as ADA and having materials that are easily accessed and reproduced by practitioners will be critical to communicating the messages to consumers.

Given the expectation that the USDA Food Guidance System will require additional updating and revision in the future, it would be wise to establish the process to systematically evaluate the existing and new evidence to support the Food Guidance System at the introduction of the new Guidance System. Ideally, the next revision could incorporate a far more comprehensive analysis of the Food Guidance System's effectiveness in meeting specific outcomes. Thus, USDA would need to establish a conceptual framework that articulates evidence analysis questions and a process to evaluate peer reviewed published research on an ongoing basis between the revisions. Establishing this framework would provide another avenue for partnering with other organizations such as ADA that are already adept in this process. ADA would open to exploring how to partner with USDA as they move forward in this process and share our experience and expertise in this area.

The American Dietetic Association reiterates its support of a thorough review process, affirms the retention of the Pyramid as the primary guidance illustration,

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[15] Attitudes, Knowledge, Beliefs, behaviors: Finding of the American Dietetic Association's pubic opinion survey Nutrition and You: Trends 2002.

[16] Americans' Food and Nutrition Attitudes and Behaviors – American Dietetic Association's Nutrition and You: Trends 2000.

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encourages USDA to give significant analytical attention to the specific consumer messages and tools, and stands ready to assist in the process as it progresses.

Sincerely,

Susan Laramee

Susan Laramee MS, RD, LDN, FADA
President

AUG 27 2004

United Fresh Fruit & Vegetable Association

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August 26, 2004

Food Guide Pyramid Reassessment Team
USDA Center for Nutrition Policy and Promotion
3101 Park Center Drive
Room 1034
Alexandria, VA 22302

RE: Center for Nutrition Policy and Promotion; Notice of Proposal for Food Guide Graphic Presentation and Consumer Education Materials; Opportunity for Public Comment

Dear Sir or Madam:

Founded in 1904, the United Fresh Fruit and Vegetable Association (United) is a national trade association representing member growers, shippers, packers, processors, marketers and distributors of fresh produce in the United States. United members provide the leadership to shape business, trade and public policies that drive our industry. Working with thousands of industry members, United provides a fair and balanced forum to promote business solutions; helps build strong partnerships among all segments of the industry; promotes increased produce consumption; and provides scientific and technical expertise essential to competing effectively in today's marketplace.

As we continue to see an alarming increase in obesity and diabetes in the United States, United believes that we must provide consumers with the fundamental tools and education necessary to assist individuals in living healthier lifestyles through good nutritional choices. Fruits and vegetables are a central part of this commitment. The current *Dietary Guidelines for Americans* call for the consumption of 5-9 servings a day of fruits and vegetables as the cornerstone of good health. Yet, on any given day most individuals do not consume the recommended amount. It is time that the government focuses its efforts and develops programs designed to aggressively address this problem.

We are pleased that the Agency has initiated a broad-based review and update of the Food Guide Pyramid, USDA's current educational tool that interprets and helps Americans use the Dietary Guidelines. The revised consumer presentation, to be known as the food guidance system, is a critical step in helping consumers develop and meet nutritional goals. We are hopeful that the new system will meet its intended objectives of encouraging consumers to make positive changes in their food choices and educate them about the amounts and types of food to eat—resulting in increased fresh fruit and vegetable consumption.

The Agency is seeking comments on any aspect of the proposed food guidance system, but has particular interest in receiving guidance specific to several topics outlined in the Federal Register notice. At the outset, United wishes to provide general comments and then address some of the areas in question.

General Comments:

The new food guidance system must be easy for consumers to understand and use while moving Americans to make real, positive dietary changes. The food guide pyramid has been a good tool, but has not been effective in helping Americans change their diet to reflect its recommendations. Fruit and vegetable consumption data alone tells us that the average American eats only 1.5 servings of fruits and 3.3 servings of vegetables daily. Moreover, more than 75% of U.S. residents failed to meet the pyramid's minimum recommendation of 5 daily servings of fruits and vegetables in 2000. The new system must incorporate strong dietary messages that are not only educational but motivational as well driving consumers to live healthier lifestyles.

The revised guidance also must clearly reflect that fresh fruits and vegetables are the cornerstone of healthy living. They are naturally low in calories, saturated fat, cholesterol and sodium and are an ideal way to keep caloric intake balanced with energy expenditure to prevent weight gain, promote weight loss, and maintain a healthy weight. Additionally, science tells us that diets rich in fruits and vegetables can greatly reduce the risk of chronic diseases such as cancer, diabetes and coronary heart disease. In fact, recognizing current science, the draft of the revised Dietary Guidelines calls for Americans to eat 5-13 servings of fruits and vegetables daily—increasing the current recommendation of 5-9. Because fruits and vegetables are a vital foundation to optimal health, it is critical that they are not "lost" within the new guidance system. Fruit and vegetable consumption information must be the foundation of any graphical representation depicting good eating habits.

Further, the current food guide pyramid makes total diet recommendations and notes that consumers should be eating 5-9 servings of fruits and vegetables daily; but, it provides no overall health messages specific to the food groups. We believe that consumers will increase fruit and vegetable consumption if they fully understand their importance to overall health. With this in mind, we feel the Agency must incorporate dramatic messages relating the health benefits of fresh produce consumption to consumers in the revised system. These messages must be strongly communicated graphically and in a narrative format and should not be buried in the overall framework of the new guidance.

The guidance should also be strengthened to communicate the need for Americans to consume a wider variety of fruits and vegetables. Economic Research Service data from 2000 tells us that potatoes, iceburg lettuce and canned tomatoes accounted for 48% of U.S. vegetable consumption and that oranges, apples and bananas made up one half of the daily fruit servings consumed. Cleary, individuals are not reaping the benefits of eating a variety of fruits and vegetables and as such may be missing the health-promoting

nutrients unique to various fruit and vegetable items. Therefore, the new guidance system must strongly convey and support the variety message and its importance to healthy living.

Finally, the Agency is planning to consumer test all of the Food Guidance System elements noted in the notice to determine how well they communicate the intended messages. United supports this consumer research and believes it is a critical precursor to the success of the system. We strongly believe that the focus group testing should incorporate a measurement tool to assess consumer awareness associated with the system's fruit and vegetable recommendations because of the obvious health benefits associated with incorporation of fresh produce into daily eating.

United's Response to USDA Issues and Questions:

The Agency is seeking input on the advantages and disadvantages of retaining the current shape for the graphic and other potential shapes to use as a representative of the overall Food Guidance System. We believe that current graphic has not been wholly successful in changing overall consumer diets, but do not feel that its lack of widespread success is the result of its shape, a pyramid. We believe that the graphic's shape may be inconsequential—pyramid, circle, square or the myriad of options. What may be needed is better public communication and messaging concerning the system's dietary recommendations. Since the pyramid has achieved a wide level of recognition among Americans, the Agency may want to consider building upon its current foundation. But, we are certainly open to exploring other graphical presentations such as pie charts, bar charts, etc. that might convey greater understanding of proportions within the diet. In fact, we encourage USDA to test all of these formats.

Final Thoughts

United supports USDA's utilization of a full array of tools that inform, promote, enable and support healthy lifestyles. The new food guidance system should be the foundation of the Agency's arsenal. We must make every effort to ensure that all Americans have knowledge that leads them to healthier living. We hope that our comments are considered as the system is established and that the resultant end-product is widely used and truly makes a positive impact on eating behaviors nationwide.

Sincerely,

Jennifer Tong

Jennifer Tong
Director, Food Safety and Nutrition Outreach

Please Note: These detailed comments provided are supported by the Fresh Produce Association of the Americas and the Ventura County Agricultural Association.

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The American Society for Clinical Nutrition, Inc.

THE CLINICAL DIVISION OF THE AMERICAN SOCIETY FOR NUTRITIONAL SCIENCES

The American Journal of Clinical Nutrition

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August 27, 2004

USDA Center for Nutrition Policy and Promotion
3101 Park Center Drive
Room 1034
Alexandria, VA 22302

Dear Food Guide Pyramid Reassessment Team:

The American Society for Clinical Nutrition (ASCN), with 1400 members, consisting primarily of MD's and/or PhD's engaged in clinical nutrition research and education, thanks you for the opportunity to comment on the proposed Food Guidance System for the food guide's graphic presentation and education materials. We appreciate your willingness to consider ways in which the Food Guide Pyramid and the Dietary Guidelines for Americans can better support the selection of foods and the pursuit of a more active lifestyle that will contribute to the health and well being of Americans of all ages.

Food Guide Pyramid Graphic

The Food Guide Pyramid has become an icon. Even its detractors have developed pyramids of their own, suggesting that the Pyramid has gained widespread acceptance and recognition, which ASCN regards as an important reason for retaining the Pyramid shape. In fact, in the interests of reducing consumer confusion and nutrition "disinformation", we would urge that the government take the necessary legal steps to protect the usage of the Food Guide Pyramid and prevent its distortion. The public should be permitted to faithfully reproduce the Pyramid as promulgated by USDA, but not distort it in any way.

In the past, the Dietary Guidelines for Americans and Food Guide Pyramid have targeted healthy people of normal body weight. But today overweight and obesity have become so prevalent that the average American adult is overweight as defined by a BMI of 25 or greater. Consequently, we would like to suggest that the content of the Food Guide Pyramid, which is proposed to be based on the Dietary Guidelines for Americans, fulfill the urgent need to provide dietary and lifestyle guidance for weight loss and for the prevention of further weight gain. Furthermore, the prevalence of overweight children is rapidly increasing and thus we urge this guidance to extend to all ages. In this regard, we urge you to review the upcoming Institute of Medicine report on the prevention of childhood obesity. Because of the urgency of this issue, it would be ideal to capture key messages and recommendations that come from that report and coordinate them with the Food Guidance System.

Bethesda, Maryland

ASCN Phone: • ASCN Fax • e-mail: Internet: http://www.ascn.org
AJCN Phone: • *AJCN* Fax: • e-mail: Internet: http://www.ajcn.org

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The shape of the Pyramid and the position of the various food groups within it are intended to convey the concept of dietary balance. Yet consumers continue to be confused about the importance of a balanced diet and have attempted to eliminate entire macronutrient groups from their daily diet. This suggests the critical need to offer more guidance to consumers on making calories count by selecting naturally nutrient rich foods from all of the food groups. Combined in a daily diet, these foods should contain reasonable portions of protein, fat and carbohydrate.

Food Guidance System Educational Materials

The Food Guidance System needs to better explain the concept of energy balance in weight control. The fundamental role of calories in versus calories out in energy balance and weight control is a concept that every child, teenager and adult needs to understand. The primary role of the Food Guide Pyramid, however, is to help consumers select a balanced healthy diet within the limits of their energy needs. To this end, many members of ASCN who teach nutrition have made use of the pyramid concept and have developed a series of Food Guide Pyramids to reflect the changing needs of people at each life stage. In the interest of making the Food Guidance System consistent with the Nutrition Facts Panel on the food label, a caloric level of 2,000 kcal/day should be chosen. Then a series of Pyramids could be developed that are scaled up or down from that energy level to reflected the recommended dietary intake at each life stage.

In response to the question of devising core messages to communicate to the consumer versus using graphic representation, ASCN support using both methods, and using professional expertise to optimize the impact of both strategies. This expertise can be utilized by forming public private partnerships and ASCN would be happy to be involved with these partnerships.

The graphic should provide a "teachable moment" in and of itself and the core messages communicated in the educational materials should be consistent with those reflected in the graphic. A campaign targeting all nutrition educators throughout the government, industry and non-profit sectors should follow the release of the graphic and core messages so that they are coordinated and repeated as much as possible in any information that these nutrition educators convey to consumers.

The Dietary Guidelines for Americans and Food Guide Pyramid are intended to be useful tools for everyone, including people of varying cultural backgrounds and educational attainment. In addition to the information in these tools being consistent across all government agencies, ASCN recommends that the serving size should be uniform with the Nutrition Facts labels on food products. We must use every tool at our disposal to provide clear guidance on energy balance and weight control and this demands clear information on ingredients, calories, nutrients, and appropriate portion sizes across all government agencies.

In addition, the listing of food ingredients on product labels should be clear and easily understood by people with a low literacy level. For example, sugars currently appear on the label in many forms, and only the aficionado is capable of recognizing certain forms of the ingredients.

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The Food Guide Pyramid is intended as a valuable educational tool, however, when it comes to nutrition education, the budget speaks louder than words. To effectively communicate the core messages and to combat the growing epidemic of obesity, we need more money for urgently needed nutrition, energy balance and physical activity education. Forming public-private partnerships can help stretch the limited nutrition education funding.

Thank you again for this opportunity to comment.

Sincerely,

Samuel Klein

Samuel Klein, MD
President

Cc: ASCN Public Affairs Committee

SNE

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Society for Nutrition Education

AUG 27 2004
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Comments on the Center for Nutrition Policy and Promotion: Notice of Proposal for Food Guide Graphic Presentation and Consumer Education Materials; Opportunity for Public Comment (*Federal Register*, Vol. 69, No. 133, July 13, 2004)

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Summary of the Comments

SNE supports the use of a government-endorsed graphic to communicate nutrition guidelines, and advocates a continued reliance on a generalized graphic to serve as an educational tool that provides an overview of healthful eating.

SNE does not support a graphic that solely "brands" the national food guidance system without it being an educational tool. A symbol only, without the educational message to complement it, would necessitate the development of multiple approaches and applications by state and/or other federal agencies, which would open the door for public confusion, misuse and misinterpretation.

SNE's specific recommendations for a new food guidance system are:

- Consistency among the food guidance system, the *Dietary Guidelines for Americans*, and FDA's Nutrition Facts system.
- Integration of a range of successful behavior modification and learning theories to form the basis for an effective food guidance system.
- A holistic approach with an emphasis on wellness and wholeness, living actively, eating in normal, balanced and nutritious ways and feeling good about oneself and others, rather than use of approaches primarily advocating calorie restriction, which usually leads to unhealthy attitudes regarding food.
- A qualitative food-based graphic to continue communication of the basic nutrition concepts of variety, proportionality, and moderation and to serve as a basis for goal definition.
- A graphic based on the minimum level of caloric intake used on the Nutrition Facts label in order to be consistent with food labels (currently 2,000 kcal). The amounts of each food group recommendation should be scaled up or down from this level for different caloric intakes.
- A separate or companion physical activity graphic that replicates the shape of the food guide graphic to emphasize the complementary nature of the two concepts.
- Core messages that are actionable and translatable to other languages frequently spoken in the United States and that are appropriate to those cultures;

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- A well planned introduction of the new system, targeting principle nutrition educators within all major federal nutrition mission areas and leading nutrition-related professional organizations, including, but not limited to:
    - U.S. Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion (CNPP), Food and Nutrition Service (FNS), and Cooperative State Research, Education and Extension Service (CSREES);
    - U.S. Department of Health and Human Services' (DHHS) Administration on Aging (AOA), the Food and Drug Administration (FDA), the Health Resources and Services Administration (HRSA), the Centers for Disease Control (CDC);
    - U.S. Department of Education (DOE) Office of Elementary and Secondary Education (OESE).
    - Society for Nutrition Education (SNE), American Dietetics Association (ADA), and others.
- An ongoing evaluation of the Food Guidance System to measure effectiveness of the graphic, the messages, the distribution system, and the reach to consumers.

Responses Organized By Specific Questions in the *Federal Register*

A. Advantages and disadvantages of retaining current shape for graphic and other potential shapes to use as a representative of the overall food guidance system.

A.1. Is the high level of recognition that the pyramid shape has attained as a symbol of food guidance important in considering a shape for the new symbol?

The Food Guide Pyramid has high consumer identification as a graphic that represents what should be consumed for good eating. Before it was officially released in 1992, extensive research was done on potential graphics with low-income audiences and schoolchildren[1, 2]. These studies showed that although the pyramid design was not perfect, it was the best of the many designs that were tested[1, 2]. The consensus of SNE members was that SNE believes that it is important to build on the existing symbol due to recognition, familiarity and use by consumers, industry, and professional food and nutrition educators. The basic shape has been replicated by many countries world-wide[3]. Drastically changing the basic shape of the symbol at this time could lend credence to criticism of the current system, which might lead the public to conclude that the USDA has emitted unsubstantiated advice over the years[4]. Since the contemplated Food Guidance System and the Dietary Guidelines, as well as the Food Guide Pyramid currently in use, have been based on opinions of the best authoritative nutrition panels in the United States, this change would be a disservice to the nutrition education community and to the public in general.

A.2. How is a pyramid shape viewed in relation to food guidance?

According to information in the *Federal Register* announcement, recent USDA research shows that many consumers can identify one or more of the key messages of variety, moderation or balance and proportionality based on the pyramid shape[5]. The work of SNE educators with their clientele substantiates this USDA finding.

A.3. How could USDA best capitalize on the recognition the original Pyramid has attained?

The best way to capitalize on the recognition that the original pyramid has attained is by retaining the basic shape, but updating the graphic to make it look new. The Daily Intake Patterns developed by the CNPP that determine the food quantities recommended for the population groups in the graphic are based on foods without added fats and sugars. These are the foods that should be illustrated in the graphic and the accompanying educational materials. SNE recommends that no triangles or circles be included in the food groups, as they tend to confuse and complicate the message. The drawing should also include in greater abundance the foods that are most recommended.

A.4. Are there reasons that a different shape would be preferable?

If there is a substantial change in dietary advice, the basic shape could be changed. However, this action would risk confusing the public as to the validity of the previous advice.

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A.5. What other shapes or graphic ideas might better communicate dietary guidance messages?

Use of a circle, pie chart and/or other graphics was considered by SNE. However, the consensus was that the drawbacks of these graphics outweighed the benefits. Considering the wide adoption of the pyramid shape/concept by other countries, it enjoys not only the support of our educators, but also the support of people from many different cultures[3].

B. Usefulness of the proposed strategies to highlight both motivational/ awareness and educational messages

Nutrition education is most effective when it is directed towards behavior and driven by theory[6]. The Transtheoretical Model (Stages of Change)[7], Social Cognitive Theory[8, 9] and the Social-Ecological Model[10] are the major theories used for program interventions in nutrition. The Health Belief Model[11] is fundamental to many community-based health education programs. However, no one model works in all situations[12]. Thus, SNE strongly advises that a range of effective behavior modification theories[10-15] form the basis for an effective Food Guidance System, and that they not be limited to just awareness and motivational aspects.

B.1. What are the pros and cons to implementing this strategy?

The Transtheoretical Model (Stages of Change Theory)[7] divides the readiness of a person to change into several stages. The first or lowest stage is precontemplation. People in precontemplation are not aware, or willing to admit, that a problem exists. At this initial stage the person may avoid new information, or they may, if properly approached, gain new understanding, or feedback about the problem behavior. At this point a person needs to acknowledge that a problem exists and to be motivated to make a change. Social Cognitive Theory indicates that the person must feel that the change is necessary and possible to achieve[8, 9]. Once a person is motivated, then he or she needs specific, small, behaviorally-focused goals that will move him or her toward the overall goal behavior depicted by the food guide.

One criticism of the current Food Guide Pyramid is that the U.S. population has not achieved healthful eating behavior, and therefore the graphic is somehow flawed as a nutrition education tool. However, the actual implementation of the Pyramid, the inclusion of numbers of servings on the graphic, or the foods depicted on the graphic, rather than the Pyramid itself, may be strong contributing factors to this phenomenon. Thus, SNE supports the concept of the new approach being a "system" with multiple educational components and channels, including background materials for implementers, with the flexibility to build in varying motivational techniques and messages applicable to specific audiences.

B.2. How can these elements be designed to best complement each other?

Motivational factors may demonstrate the benefits and decrease the barriers of healthful eating, or offer insight into the increased threats to not eating healthfully. The latter component involves individuals accepting that they may be at higher risk for diseases or further severe consequences if they are not practicing healthful eating habits. A person should also be able to see that there will be positive outcomes in taking the recommended action.

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Other motivational aspects include:

- Eating more healthfully can include delicious food prepared in attractive ways;
- Eating more healthfully can include enjoyable dining experiences and does not imply that a person will be deprived of foods or food preparations that are important to them;
- Eating more healthfully can be done in a way that is glamorous, quick and makes efficient use of available time; and,
- Eating more healthfully can be an opportunity for parents to encourage health-promoting food selection and preparation as an opportunity for education and family interaction.

SNE finds motivational and awareness factors crucial to achieving behavior change in individuals.

B.3. Would other strategies better communicate the multiple consumer messages of the food guidance system?

In order to consciously change behavior, individuals must have a clear concept of: what defines the desirable behavior, i.e. what is the model or goal behavior that is sought[13, 14]; understand that the change is possible[8, 9]; and, be motivated to adopt the desired behavior[11]. This multi-faceted strategy should be the central goal of the food graphic and the Food Guidance System.

When a clear concept of the desirable behavior is developed, a person then can develop a strategy that involves cognitive, affective, and psychomotor areas that promote the behavior. To change behavior, people must first be aware of what they are doing right and then feel good about it. This behavior then forms a starting point to build an even more desirable set of behaviors[16]. Examples of educational approaches that incorporate positive feedback based on individual behaviors should be included in the accompanying literature.

Behavior and problems can differ from person to person, and from community to community, so solutions must be tailored to the specifics of each situation.

Prior to applying motivational/awareness aspects it is essential to identify the true nature of the problem. For example, in Bangladesh[17], where vegetable gardens were abundant, the mothers were not feeding the vegetables that they grew to their children. A study of the situation showed that mothers thought that their children could not assimilate nutrients from vegetables. The intervention was then focused on finding adequate ways to convince the mothers that their children did, in fact, assimilate nutrients from the garden vegetables, although their fecal matter was green instead of the brown color observed when they did not eat vegetables. In Africa, a similar observation was made involving children deficient in vitamin A[18]. However, in this case it was found that the machinery used to express oil was too complicated for local technicians to fix. Although vitamin A was abundant in the foods available, it was not absorbed because of a lack of fat in the food supply (since fat is necessary for vitamin A absorption). Introducing less complicated machinery alleviated the situation. In both these cases, at the macro level the problem was the same, i.e., deficiency of vitamin A. However, the specifics of the situation dictated very different solutions to the problem.

To summarize the situation:

- In order to be effective, the ultimate goal (achieving good nutrition) must be clear.
- Each situation must then be evaluated as to how a population or an individual can be motivated best to move in the direction of the goal.

While keeping the core messages simple, background materials for educators, i.e. public health professionals, nutrition educators, teachers, etc., should include more detailed information focusing on employing motivational techniques that can be adapted for meeting the varying needs of intended target groups.

C. Advantages and disadvantages of the plan to individualize guidance in contrast to "generalized" messages.

While SNE appreciates the concern about the increase in obesity in the United States and worldwide, many of our members have come to understand that the best way to confront this situation is by using the "health-at-any-size" paradigm. This approach helps to prevent disordered eating patterns such as anorexia nervosa and bulimia, as well as over-consumption, with a focus on wellness and wholeness, i.e., living actively, eating in normal, balanced and nutritious ways and feeling good about oneself and others. The basic idea is to be spiritually, mentally, and physically healthy, rather than striving for the less appropriate goal of being thin. When health instead of thinness is the goal, people can feel good about improving their diets or increasing their activity levels no matter what their weight. Positive feelings can fuel the self-efficacy needed to make the healthful habits permanent. Diet-based methods to treat obesity result in 80% [19] to 100% [20] failure to maintain the lost weight over a two to five year period after termination of the diet.

Food guides and the educational programs based on them have always focused on assuring adequate nutrient intake if foods are selected according to the groups included in the guide. This fundamental message must be the focus of the food guidance system designed. The questions whose answers must be assured are:

- Does the food guide depict goal behavior that assures adequate nutrient intake if the advice is followed?
- Does the guidance system lead to the implementation of this behavior?

C.1. How can educational materials best be designed to provide this more specific guidance?

Clearly defined goal behavior must be central to the food guidance system. The specifics for each individual are then conceptualized within the overall general framework of what is needed for everyone. In this way a strong conceptual framework is constructed on which to accommodate individual differences[13].

The Daily Intake Patterns form the basis for the food guide. SNE has previously recommended that in the interest of making the translation of the general guidance of the food guide to more specific guidance simpler, one specific caloric level be selected for illustration. If

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this were done, the Daily Intake Patterns could then be scaled up or down from that level to accommodate the specific needs of various age and caloric groups. SNE strongly recommends consistency among the Food Guidance System, the Dietary Guidelines and the Nutrition Facts Label. With this in mind, SNE recommends choosing a 2,000 kcal level, or whichever caloric level is consistent with the Nutrition Facts Label.

Consistency among the Food Guidance System, the Dietary Guidelines and the Nutrition Facts Label means that only one set of measurements would need to be memorized for each group or food. However, the measurements would need to be based on the highest relative needs for a particular age group and then scaled up or down for different caloric needs. A small child eats approximately half of what an adult eats in every food group, with the possible exception of the milk group, and the amounts should be modified accordingly. In addition, the basic food guidance pattern would have to be designed in such a way that scaling would include the nutrients needed for the various sex, age and activity levels that are contemplated. The advantage of the scaling system in terms of food composition is that it eliminates the need to adjust the patterns by established increments, e.g., cups, ounces, etc., and provides a means for more flexible advice that can be applied in families or other groups, depending on their individual needs.

Table A illustrates an example of the problems inherent in the Daily Intake Patterns. According to the Daily Intake Patterns there are five sub-groups of vegetables. Table A gives the vegetable sub-groups recommended for a hypothetical four-person family. In this table it can be seen that the mother's Daily Intake Pattern (based on 1,800 kcal) presumably falls somewhere between the recommendation for the daughter and the father, but it is not clear how many servings of each group would be recommended. The implication is that half serving sizes would need to be measured for some of the sub-groups.

As Table A indicates, the number of servings per week varies from one caloric level to the next. Most people would interpret this as meaning that they had to cook dark green vegetables every day for the son, and only four days for the daughter. The recommendations, interpreted in this way, are impossible to follow. It would be much easier to state that the standard amount to be consumed is ½ cup of deep green vegetables four times a week. If you need to eat more calories, consume more of every food group; if you need to eat fewer calories, eat less from every group. This is information that the average consumer can more readily understand.

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Table A

	1600 Kcal. (daughter 9-13)		1800 Kcal. (mother 31-50)	2200 kcal (father: 31-50)		2800 kcal (son: 14-18)	
	Servings per week	% servings per week	Servings per week	Servings per week	% servings per week	Servings per week	% servings per week
dark-green (1)	4	19.1%	?	6	21.5%	7	16.6%
deep-yellow (2)	3	14.4%	?	4	14.3%	6	14.3%
legumes (3)	5	23.7%	?	6	21.5%	7	16.6%
starchy (4)	4	19.1%	?	5	17.8%	9	21.5%
other (5)	5	23.7%	?	7	25.0%	13	30.9%
Overall recommendation	21 3/day	100.0%	?	28 4/day	100.0%	42 6/day	100.0%

(1) examples are: broccoli, spinach, romaine, collard, turnip and mustard greens
(2) examples are: carrots, sweet potatoes, winter squash, pumpkin
(3) examples are: pinto beans, lentils, chickpeas, tofu
(4) examples are: white potatoes, corn, green peas
(5) examples are: tomatoes, tomato juice, lettuce, green beans, onions

C.2. What are the pros and cons of attempting to provide individualized rather than general guidance?

Both general guidance and specific messages are needed, but when they are needed and how they are implemented depends on the circumstances. General messages are needed to unify the overriding message and form a conceptual basis on which to add the specifics that are necessary for each individual. General messages are also needed for program planning and evaluation of program effectiveness.

The Food Guidance System, as currently proposed by the CNPP, is divided into age and gender groups. For each group, a particular caloric level has been established, which is used to provide specific quantities of each food group for a person of a particular age and gender. However, this system ignores some basic, but important, facts – people of the same age and gender are not all the same size, with the same level of physical activity and/or the same caloric needs.

Pros

Individualized advice can work if it is based on a clear conceptual goal and one food grouping system that can be scaled up or down depending on individual needs.

Cons

Individualized guidance as currently contemplated in the materials published by the CNPP is too complicated for people to follow in their daily lives.

C.3. What guidance messages are appropriate as general messages

Once the conceptual framework given in Section D is established, SNE suggests the following for use as general messages:

- Eat a variety of nutrient-rich foods from each food group to help ensure good nutrition and health.
- Eat three or more meals daily, at about the same time every day.
  - Eat a morning meal that includes food from at least three of the food groups.
  - At the mid-day meal, and in the evening meal, include foods from all food groups.
  - If you eat between-meal snacks, include foods from two of the food groups.
- Eat slowly. Stop eating before you are overly full.
- Try a different food or a new way of preparing a healthful food every week from a food group you need to eat more from.
- Choose whole grains for at least half of your choices from the grains and potatoes group.
- Use fats, salt and sugars in small amounts. Depend more on spices and herbs to give rich flavor to your foods.
- You can start today. Replace a less healthful food you eat with a more healthful one.
- Have a specific place or places in your house, away from the television or other distraction, where you and your family eat[21].
- Make sure that your daily routine includes adequate physical activity.

D. Advantages and disadvantages of the planned focus on core messages in contrast to use of a graphic to represent educational messages

D.1. Is this plan feasible?

Many nutrition education programs have used the Food Guide Pyramid as an icon for their nutrition education efforts. These programs have then featured one of the dietary guidelines or some other aspect of the basic nutrition messages. Therefore, an icon with core messages is feasible.

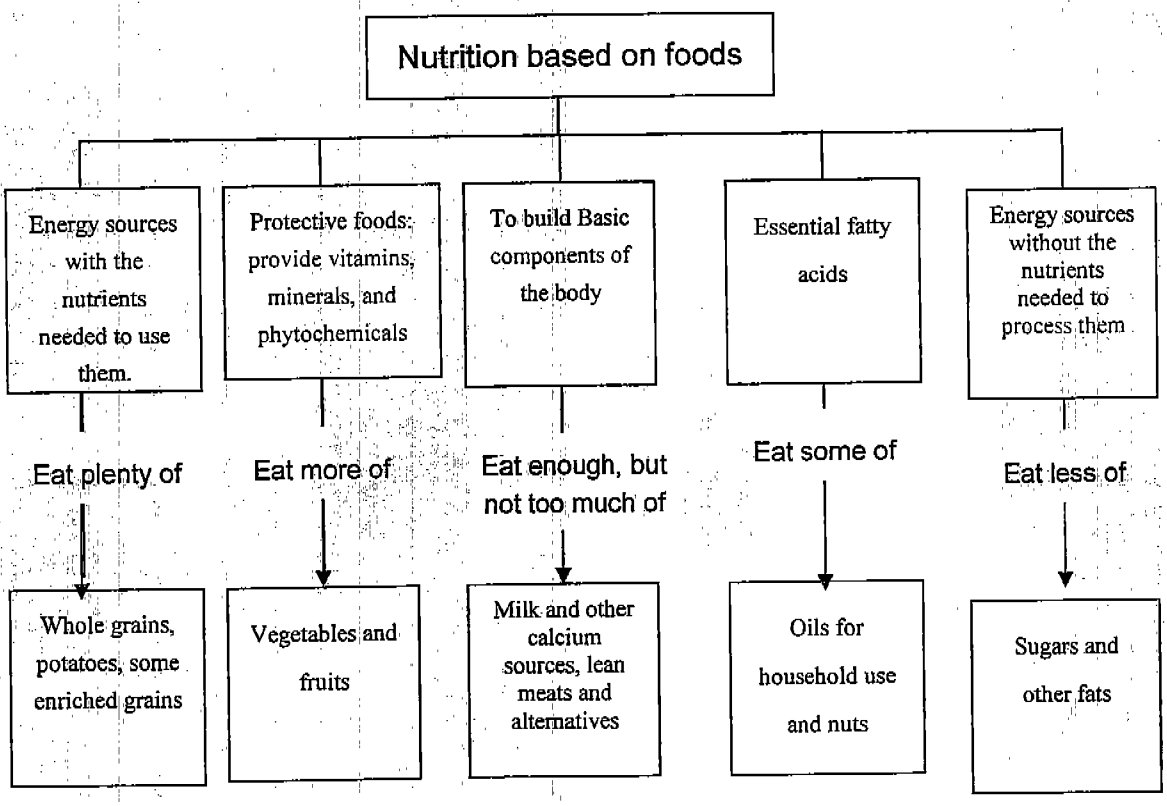
While SNE concedes that it is feasible to use an icon with core messages, SNE is convinced that this approach is not advisable. Learning and concept formation theory indicate that in order to make sense of the world people need an adequate conceptual structure to which they can add new information. Cognitive structure is hierarchically organized, with concepts in the cognitive structure undergoing progressive differentiation[13, 14]. A graphic, such as the Food Guide Pyramid, establishes this hierarchy. Organization-of-documents theory establishes that such a graphic should have no more than five categories, so that all can be remembered[22]. The psychological literature has established that working memory can deal with no more than seven categories[23].

D.2. Is it preferable to using the graphic to communicate essential food guidance messages?

SNE advocates a distinctive graphic that illustrates basic nutritional advice and conveys the messages of balance, proportionality and variety based on food groups instead of merely an icon. This graphic should be designed to illustrate goal behavior. If it is distinctive enough, it could also be used as an icon for the food guidance system, as some have done with the existing Food Guide Pyramid graphic.

As can be seen in Illustration 1, a well planned hierarchy, based on nutrient functions, can be transformed into foods, bypassing the need to mention the complicated names and concepts that nutrient recommendations elicit. The beauty of using foods as the basic components for recommendations is that although they are renowned for certain characteristics, they also have other nutrients in smaller amounts that complement those that are of most interest[24]. This means that when we add up the nutrients based on basic serving sizes, as is done with the Dietary Intake Patterns, the pattern of foods recommended approximates the Recommended Dietary Allowances for a day.

Illustration 1 [1]



[1] Oils used by the food industry have very different fatty acid composition than those available for household use

These five basic groups then become the tiers of the pyramid, as was done in the original drawing, with the exception of the oils for household use and nuts group. By adding this group, the problem of explaining fats and oils becomes manageable. By placing potatoes in the grains groups, all the major sources of nutrient-containing starches that are used interchangeably in planning meals are put together, while those carbohydrates that do not provide the nutrients necessary to process the energy they contain are properly grouped in the sugars and fats category. Milk is used in this conceptual framework instead of non-fat or low-fat milk so that it applies to everyone, including children less than two years old. While this organization of concepts does not explain the whole story, it does give a framework within which the qualifying statements can be placed.

Another advantage of this system is that it illustrates from which groups one should eat more of, and from which groups one should eat less. This type of hierarchy helps guide educators working with consumers in the direction of emphasizing that that if a person is to eat more whole grains, potatoes and enriched grains, and fruits and vegetables, that person must eat fewer sugars, fats and meats or meat alternatives, to keep his or her caloric intake constant. It gives a conceptual framework that can be used by consumers to organize their understanding of nutrition.

Since we are most concerned about a conceptual framework based on foods, physical activity has not been included. Physical activity is another complex idea that includes work place activity as well as leisure activity. Physical activity cannot be adequately summarized by a simple icon, such as a runner, and it cannot be easily added to the framework designed above. Thus trying to include physical activity would greatly complicate the guidance system's healthy food consumption message.

Water is essential for health, but comes from many food and beverage sources. The 2004 Institute of Medicine (IOM) Dietary Reference Intakes report defines total water intake as that consumed from all foods and beverages in addition to plain water. Adequate Intake levels are defined in terms of total water intake, as opposed to drinking water[25]. This means that including water as an additional component of the hierarchy and the graphic does not convey a useful concept. Food guides from other countries that have tried to include a beverage group have been unable to arrive at a definition of beverages that is conceptually easy to understand and makes sense scientifically[3]. In the Food Guide Pyramid, nutritive beverages are included in their appropriate food groups and SNE recommends this approach be retained.

D.3. What advantages and disadvantages are there in using the graphic as a symbol to represent the system rather than as an educational tool?

Advantages:

The advantage of using a logo or icon is that there is less text. SNE recommends a graphic that is as distinctive as the Food Guide Pyramid, but does not include the portion information on the graphic. (This would be explained in the accompanying materials). This graphic then could be used for teaching the basic nutrition concepts, as well as used as an icon for the Food Guidance System.

Disadvantages:

The main disadvantages of using only an icon are: 1) there is no specific graphic summary of the goal behavior desired and 2) there is no teaching tool that unifies the guidance system. An icon-only approach makes it much more difficult for people to remember the basic concepts that are being taught. It is the opinion of SNE that designing the graphic not as a teaching tool will increase the chance of misinterpretation and misuse. Also, if the USDA does not provide a graphic that can be used for teaching basic concepts, it is probable that other federal, state and local agencies will create their own versions. This would result in a great deal of confusion. If a graphic is designed that clearly reflects the proportions to be consumed from the food groups recommended, misinterpretation of the graphic would be much less likely, even though accompanying materials may not be readily available.

E. Key components for effective interactive educational tools.

As a basis for this section, SNE used the following assumptions:

- Some type of pyramidal graphic will be retained.
- 12 recommended calorie levels will be included in the interactive educational tool.
- The Interactive Healthy Eating Index (IHEI) as the model (with the understanding that it needs to be modified to reflect added sugars and dietary fiber).
- The interactive tool will be consistent with the food graphic, but go far beyond the basic generalities that the food graphic depicts. (Note: The people who access this tool will be looking for more in-depth information and capable of understanding more than the generalities of the basic graphic.)

E.1. What makes an effective personalized or interactive tool?

- It is individualized to the person's gender, age, size, activity level, and reproductive status.
- It is easy to access, enter data, and use.
- There are visuals and graphics of serving sizes.
- It is fun to use for a variety of ages and groups, but still efficient for use by researchers who need to score the Interactive Healthy Eating Index (IHEI) and food group servings for large samples.
- Common foods from diverse ethnic groups in the U.S are graphically represented and found in the database.

E.2. What information should be provided to help consumers who seek only basic information on appropriate food choices and amounts?

- People should be able to obtain basic food-group-based dietary pattern recommendations individualized for their age, gender, reproductive status, height, weight, and activity level (sedentary, moderately active, very active).

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- The graphic, if presented as an interactive tool, should illustrate the types and amounts of food recommended for a consumer's demographic data. This could be done by showing the reference serving size and then the amount that should be added or subtracted to meet the needs of the individual based on the calculated caloric needs. However, since the metabolic rate of each individual varies, as well as the activity level, such information will always be an approximation. The program should be clear that this is the case.
- There should be a graphic description of an individual's food intake in comparison to the recommended dietary guidance.
- Food groupings and nutrient data must be added for additional mixed foods and currently consumed foods.
- What counts as one serving or basic food unit must be clearly depicted.

E.3. What information should be added for consumers that want to plan and assess their diets?

- The IHEI should be improved by adding sugar and dietary fiber as two new major components to the current 10 guidance components.
- Units for nutrients must include the option of either those present on the Nutrition Facts Label or those in the Dietary Reference Intakes (DRI). Thus, for several nutrients two sets of values will be presented: Vitamins A, D, and E.
- Currently consumed foods and foods commonly consumed by our diverse ethnic populations must be added. For example, from where can vegans get vitamin B-12, calcium and Vitamin D?
- When a consumer enters the Website or CD Rom, a question should be asked regarding whether weight loss is desired. If not, then no other comments about weight should appear. If yes, then recommendations might be made regarding slow caloric reduction of food and as well as increased activity expenditure to lose 1-2 pounds per week and the importance of eating for good health, not for weight loss. A statement that health can be achieved at any size with good food and activity choices should be made. If the consumer has a BMI less than 20, then some caution about further weight loss should appear.

E.4. What elements should be developed to help consumers personalize their diets?

- There should be a graphic depiction of basic units (servings and serving sizes) with modifications necessary for the particular consumer's demographic data and daily food intake. This graphic should depict a balanced or imbalanced pyramid, or an imbalanced image of whatever graphic is adopted, including a comparison with the number of servings of fats and sugars recommended for that person's energy level.
- The IHIE must be expanded to include one component each for fiber and for added sugars.
- Appropriate serving sizes for toddlers and preschool children, as recommended by the

Food and Nutrition Service (FNS) programs of Child and Adult Care Food Program (CACFP) and Special Supplemental Nutrition Program for Women, Infants and Children (WIC), and Health Resources and Services Administration (HRSA) such as Head Start, must be added to the IHEI so it is appropriate for professionals to use with preschoolers. As it currently stands, the Food Guide Pyramid for Children and the Food and Nutrition Service guidelines group foods differently, creating extreme difficulty when using the Children's Food Guide Pyramid within the context of the FNS programs.

E.5. What caveats should be considered in developing individualized guidance?

- Add "This Website is not intended as nutritional counseling for medical conditions. This information should be provided by health care professionals, such as physicians and dietitians."
- Choose frequently food and beverages rich in nutrients in comparison to the calories provided, i.e., nutrient dense foods.
- List other reputable links for additional nutrition and health information.

F. Channels of delivery for the Food Guidance System

F.1. Once the new Food Guidance System is released, what are the most efficient and effective ways to reach consumers?

A multi-channel roll-out with varied government and community-based agencies/media/trade organizations/industry partners/CDC and schools is needed. Professional and community organizations should include, but not be limited to: the American Dietetic Association, American Public Health Association, American Medical Association, American Heart Association, Society for Nutrition Education, School Nutrition Association, Boys and Girls Clubs, and Action for Healthy Kids. A concerted outreach and marketing campaign through Cooperative Extension, public schools, WIC, Head Start and public health will "saturate" the public sector. All government agencies should collaborate and provide a joint announcement of the new system (USDA/DHHS). Industry should be encouraged to link their food items to the graphic. In addition, the Food Guidance System should be introduced at nutrition, medical and science meetings over a two-year period.

To disseminate the system consistently over time, spokespersons or intermediaries need to be available to conduct trainings and answer questions from the industry, medical professional groups, i.e., MDs, RDs, nurses, dentists, and allied health professionals, and consumers on the new system.

The new system can be marketed through all national, state and local newspapers and TV, including targeting culinary programs/chefs on food channel programs, radio and cable stations and on the web. Trade organizations should broadly disseminate the new system. A roll-out during March, National Nutrition Month, would be very effective. A Transtheoretical model should be the basis for the public awareness campaigns. This means that local people

should coordinate with food donation agencies, supermarkets and other food outlets to assure that the recommended foods are available to the people who will receive the messages.

Training professionals on the new system and providing supporting educational materials for school-age youth and adults is critical. In addition, guidelines for industry and consumer use are important. Industry should be encouraged to use the system for promotion of healthy eating.

F.2. Are internet-based and print educational materials most accessible to educators (information multipliers) and consumers?

All publications need to be available in hard copy and on-line. Limited-resource families often miss materials that are available solely on-line. Educators need access to printed copies of graphics and brochures and printing should not be short-changed in favor of online publishing. Posters, simple brochures, CD, DVD, Internet website, kiosk are recommended.

Cultural adaptation including bilingual publication in other languages is critical for broad dissemination, but the best way to implement this would be to have USDA/CNPP issue development standards for cultural graphics, and then let professionals adapt the materials to best suit their target audiences. These guidelines should include statements that they have studied the nutrient content of the foods included in the new or modified graphic to assure that it conforms to the standards used for the original graphic. The culturally adapted guide should include foods that are commonly used by the group and grouped according to cultural standards. To be as explicit as the food guide developed by the USDA/HHS, prepared dishes of mixed foods should not be part of the graphic. As with the graphic that will come out of this process, people will have to understand that they can combine the foods in food preparation and do not have to serve each food separately. The guide should be evaluated by representatives of the target populations so that they can assess if others can understand and follow the system.

F.3. Are there audiences that will not be able to access information on the internet?

Downloading the food guide pyramid to copy does not work for many educators and consumers. Pre-printed multi-color copies should be provided at low cost to reach multiple audiences. Multicolor documents do not print well when duplicated and duplicating is preferred by smaller agencies. Therefore the teaching materials should also be prepared as simple black and white line versions, or grayscales, on slicks so that they can be successfully duplicated. Downloading might turn out to cost programs such as WIC, FNS, and EFNEP more than they currently spend because printer cartridges and paper to print their own food guides are more costly than if they were mass-produced on a national scale.

F.4. What alternatives are available for reaching these audiences?

Marketing the new graphic on supermarket register tapes, grocery bags and through non-food industry such as banks, insurance companies and utility companies will allow for broad dissemination. Major industry or payroll stuffers with Social Security checks can help with marketing the new materials. Other non-traditional sites for dissemination of nutrition education information could be explored. For example, the public could receive Food Guide System information where people have to wait in queues, such as drivers' license offices and banks.

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Additional Comments: Evaluation of the Food Guidance System

Currently there is no Federal requirement for either process or outcome evaluation of the USDA Food Guidance System. Without this requirement, it may be difficult to devote resources for this purpose. Nevertheless, evaluation is essential in assessing the outcomes of the USDA Food Guidance System and its implementation, and providing insights for improvement. Given the public health costs of poor diets and the importance of improving diet and health, it is a false economy to ignore evaluation. Important aspects of evaluation include:

- Process evaluation to answer questions such as the following: Is the Food Guidance System being implemented in nutrition education and food assistance programs? One of the current problems is inconsistency between the food groupings in the Children's Food Guide Pyramid and the Child and Adult Care Food Program (CACFP) guidelines. This makes if difficult to use the Food Guide Pyramid with that program. A process evaluation would assess to what extent these kinds of barriers have been identified and overcome. It would also assess diffusions of USDA Food Guidance System messages.
- Effectiveness of implementation activities in changing dietary behavior.
- Effects of changed behavior on nutritional status and health.

For evaluation to even be possible, it is necessary to maintain an adequate national nutrition monitoring system. Food and nutrient databases must be complete and up-to-date. National data on food consumption, food expenditure, diet-health knowledge, and health status need to be collected regularly. Making data available in a timely manner to researchers at universities and other private sectors would encourage more policy-oriented research and evaluation, thus adding to the information base.

References

1. Nestle M. 2002. Food Politics: *How the Food Industry Influences Nutrition and Health.* Berkeley: University of California Press.
2. Welsh S, Davis, C, Shaw A. 1993. *USDA's Food Guide: Background and Development.* Washington, DC: U.S. Government Printing Office, U.S. Department of Agriculture, Human Nutrition Information Service. Miscellaneous Publication No. 1514.
3. Painter J. 2004. *Exploring food guide graphics from culturally diverse nations.* Presentation given at the Society of Nutrition Annual Conference, Salt Lake City, Utah. July 19.
4. Harvard School of Public Health. *Food Pyramids: What should you realy eat?* www.hsph.harvard.ecu/nutritionsource/pyramids.html. Accessed July 1, 2004.
5. Federal Register, Vol. 69, No. 133/Tuesday, July 13, 2004. *Notices.*
6. Contento I, Senior Author. 1995. The effectiveness of nutrition education and implications for nutrition education, policy, programs and research. A review of research. *J. Nutr. Educ.* 27:279-418.

SNE 17 of 17

7. Prochaska JO, Velicer WF. 1997. The transtheoretical model of health behavior change. *Am. J. Health Promotion* 12(2):38-48.

8. Bandura A. 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory.* Englewood Cliffs, NJ: Prentice Hall

9. Baranowski T, Perry CL, and Parcel GL. 2002. How individuals, environments, and health behavior interact: Social cognitive theory. In: Glanz K, Rimer BK, and Lewis FM (eds). *Health Behavior and Health Education: Theory, Research, and Practice.* 3rd. ed, pp. 165-184.

10. Gregson J, et al. 2001. System, environment, and policy changes: using the social-ecological model as a framework for evaluating nutrition education and social marketing programs with low-income audiences. *J. Nutr. Educ. Behav.* 33: S4-S15.

11. Glanz K, Rimer, BK, and Lewis FM., 2002. Health Behavior and Health Education: Theory, Research, and Practice. 3rd ed.

12. Achterberg CA, Miller C. 2004. Is one theory better than another in nutrition education? A Viewpoint: more is better. J. Nutr. Educ. Behav. 36:40-42.

13. Novak JD, Gavin DB. 1984. *Learning how to learn.* Cambridge: Cambridge University Press.
14. Novak JD. 1977. *A theory of education.* Ithaca, NY: Cornell University Press.

15. Gerhard M. 1971. Effective Teaching Strategies with the Behavioral Outcomes Approach. West Nyack, NY: Parker.

16. Belenky MF; Clinchy BM; Goldberger,NR; Tarule JM. 1986. Women's Ways of Knowing: the development of self, voice, and mind. New York: Basic Books.

17. Sultana N. July 1998. *Sustainable programs from a global perspective: Bangladesh.* Presented at the SNE Annual Conference in Albuquerque, NM, July.

18. Silva-Barbeau I. July 1998. *Sustainable programs from a global perspective: Africa.* Presented at the SNE Annual Conference in Albuquerque, NM.

19. Pi-Sunyer FX. 1999. Obesity. IN: Shils ME, Olson, JA, Shike M, Ross AC. Modern Nutrition in Health and Disease, 9th ed. Baltimore: Williams & Wilkins., p 1395-1418.

20. Berg F. 2004. Underage and Overweight: America's Childhood Obesity Crisis—What every Family Needs to Know. How York: Hatherleigh.

21. Ferguson JM. 1975. Learning to Eat: Behavior Modification for Weight Control. Palo Alto, CA: Bull.

22. Morgenstern J. 1998. *Organizing from the Inside Out.* New York; Henry Holt.

23. Achterberg C. 1988. Factors that influence learner readiness. *J. Amer. Diet. Assn.* 88: 1426-1428.

24. Joint FAO/WHO Consultation. 1998. *Preparation and use of Food-Based Dietary Guidelines.* Geneva: WHO Technical Report Series 880.

25. Institute of Medicine. 2004. *Dietary Reference Intakes for Water, Potassium, Chloride and Sulfate.* National Academy of Sciences.

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INTERFRESH

A World of Fresh Ideas!

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Puentes 1 of 1

August 26, 2004

In regards to: Food Guide Pyramid
Food Guide Pyramid Reassessment Team
USDA Center for Nutrition Policy, and Promotion
3101 Park Center Drive, Room 1034
Alexandria, VA 22302

As America grows ever fatter and more sedentary, there has never been a more important time to urge consumers to enrich their diets with more fruits and vegetables. As you are aware, there is a plethora of science-based research indicating the *extreme* health benefits of a diet rich in fruits and vegetables. As you compile the new food pyramid guidelines for release later this year, I cannot urge you strongly enough to move fruits and vegetables to the very base of the pyramid, and encourage 5-13 servings per day. We feel strongly that this will send a new and clear message to America, and help move the country toward a healthier weight, and life.

Please retain the current pyramid graphic, and move fruits and vegetables to the very bottom. It is my hope that America may begin to understand that we are falling far short of a healthy diet, and that your new guidelines will lead us to a healthier place.

Best regards,

Chris Puentes
President
Interfresh, Inc.

• Fullerton, CA
Telephone • Fax

California
AVOCADO COMMISSION

AUG 27 2004

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MICHELLE P. SPELMAN
Marketing Director

August 25, 2004

Food Guide Pyramid Reassessment Team
USDA Center for Nutrition Policy and Promotion
3101 Park Center Drive, Room 1034
Alexandria, VA 22302

RE: CAC Comments in response to Federal Register 04-15710, Vol. 69, No. 133

Dear Food Guide Pyramid Reassessment Team:

On behalf of the California Avocado Commission, which represents 6,500 California avocado growers and one of the 20 most commonly consumed fruits in America[1], please accept these comments on the proposed Food Guidance System.

As you work to develop a revised graphic that provides consumers with a guide to healthful eating, we urge you to prominently display nutrient-dense avocados along with other health-promoting fruits and vegetables in the new graphic. The latest scientific findings reveal the following about avocados:

- Avocados are a naturally nutrient-dense fruit. Ounce-per-ounce, avocados contain more of six minerals (potassium, magnesium, iron, zinc, phosphorus, and copper), seven vitamins (folate, Vitamin E, Vitamin K, riboflavin, niacin, pantothenic acid, and biotin), and three phytochemicals (lutein, beta-sitosterol, and glutathione) than any of the 20 most frequently consumed raw fruits.[2-5]

- Uniquely, avocados are one of few fruits that provide "good" fats. Unsaturated fats like monounsaturated fat found in avocados[6], have been linked to a reduced risk of heart disease, cancer and diabetes.[7-10] In addition to monounsaturated fatty acids, avocados also contain heart-healthy omega-3 fatty acid.

- Replacing "bad" fats with "good" fats, increasing omega-3 fatty acid intake and consuming a diet rich in fruits and vegetables are the three steps to a healthier heart. California avocados offer an important nutrient profile that meets all three.

Irvine, CA ■ ■ Fax ■ www.avocado.org

Spelman for 4

- New research from Ohio State University shows that the natural fat content in avocados increases carotenoid absorption from other fruits and vegetables, which can further protect the body from disease.

Regarding the Topics of Particular Interest to CNPP for Comments, we offer the following:

Retaining Current Shape of Graphic:
It is important to provide a graphic that is familiar to consumers. We are supportive of maintaining the pyramid shape because it is well recognized, but recommend that it be designed in line with the expected recommendation from the Dietary Guidelines Advisory Committee for consumers to eat at least 5 to 13 servings of fruits and vegetables a day. With the increased emphasis, the graphic should have a foundation of more fruits and vegetables, including nutrient-dense avocados. Substituting fruits and vegetables for refined grains at the base of the pyramid will be beneficial for the overall nutritional needs of consumers by providing more vitamins, minerals, fiber and phytochemicals. Given the scientific support for healthy fats, it is important for the new Food Guide to distinguish between saturated fats and trans fats vs. heart healthy unsaturated fats.

Proposed Strategies to Highlight Both Motivational/Awareness and Educational Messages:
Maintaining the pyramid as a symbol for health and nutrition will be effective as long as it is perceived as the starting point of an entire system tailored to meet appropriate activity and nutrition goals. A possible slogan to consider: Food Pyramid: The First Step Towards a Healthier Life.

When developing the new system, it will be important to encourage quality food choices in the Daily Food Intake Patterns. When listing the appropriate amounts for different consumers, we encourage you to recommend selecting nutrient - dense foods first. This could prevent consumers from continuing to over indulge on "empty calorie" foods that do not satisfy appetites and provide little source of nutrients. Providing satisfaction and taste, avocados are a nutrient-dense fruit, top-ranking in key nutrients that can help prevent disease.

The Food Guidance system should take an overall wellness approach to obtaining health and encourage consumers to use the pyramid as a guide for nutritious food selection and appropriate serving size. Communicating the benefits of regular exercise along with a nutritious diet should be a major emphasis of the new Food Guidance System. Calories count and consumers need to realize that nutritious foods will serve their bodies well. In fact, recent research published in *Obesity Research* suggests that exercise burns monounsaturated fat stored in the body more rapidly than saturated fat. Thus, for consumers who want to burn off fat, substituting healthier monounsaturated

fat from avocados for the saturated fats found in meat and dairy may be beneficial.[11]

Individualize Guidance in Contrast to "Generalized" Messages:
We agree that "one size does not fit all" when encouraging consumers to maintain a healthy body weight. Thus, the new Food Guidance System should be tailored to specific energy intake and physical activity levels. Further, all consumers could benefit from a general message encouraging them to eat a balanced diet of nutrient-dense foods including: fruits and vegetables like avocados, whole grains, and lean protein sources.

Planned Focus on Core Messages in Contrast to Graphic Use:
We agree that the Food Guidance System cannot communicate to everyone in one graphic. Therefore, the revised pyramid could evolve as more of a symbol of nutrient-dense foods that consumers can select from as they evaluate the core messages tailored to their specific needs. If you implement a tailored core message system, it should be clearly noted on the graphic that it is not a stand alone piece.

Key Components for Effective Interactive Educational Tools:
As you develop the interactive tools for consumers to utilize as part of the Food Guidance System, we encourage you to provide databases that are harmonized with FDA's Nutrition Facts Labels to minimize confusion and improve dietary habits. Updated values from the SR-16, SR-17 databases should be incorporated into the databases for consumers. A guide could monitor food intake and quality food selection, encouraging consumers to select nutrient-dense foods like avocados to satisfy hunger.

Delivery Channels:
We concur that an Internet-based distribution complemented by print materials distributed to schools and nutrition educators will be most effective. If possible, materials should be designed specifically for children, men and women.

We are encouraged by CNPP's emphasis on educating consumers to keep caloric intake balanced with energy expenditure to prevent weight gain and maintain a healthy weight. We are also encouraged by the promotion of nutrient -dense foods.

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Thank you for considering our comments for the new Food Guidance System. In closing, we would like to point out that avocados are included in dietary programs from many of the world's leading nutrition organizations including: USDA's Dietary Guidelines for Americans, National Cancer Institute's 5 A Day Program, American Diabetes Association's Diabetes Food Pyramid, The Mediterranean Diet Pyramid and UCLA's California Cuisine Pyramid. **We urge USDA to prominently display avocados in the new Food Guidance System to emphasize the importance of consuming a variety of health-promoting fruits and vegetables.**

Sincerely,

Michelle Spelman
Marketing Director

Sources:

1. Code of Federal Regulations, Title 21: Food and Drugs, 2002. 21CFR101.44 Identification of the 20 most frequently consumed raw fruit, vegetables, and fish in the United States.
2. U.S. Department of Agriculture, Agricultural Research Service. 2003. USDA Nutrient Database for Standard Reference, Release 16. Nutrient Data Laboratory Home Page, http://www.nal.usda.gov/fnic/foodcomp
3. U.S. Department of Agriculture and Nutrition Coordinating Center at University of Minnesota, 1998. USDA-NCC Carotenoid Database for U.S. Foods. Published at http://www.nal.usda.gov/fnic/foodcomp/Data/car98/car98.html
4. Duester KC. Avocado fruit is a rich source of beta-sitosterol. J Am Diet Assoc 101:404-405, 2001.
5. Jones DP, Coates RJ, Flagg EW, Eley JW, Block G, Greenberg RS, Gunter EW, and Jackson B. Glutathione in foods listed in the National Cancer Institute's Health Habits and History Food Frequency Questionnaire. Nutr Cancer 17:57-75, 1992.
6. Code of Federal Regulations, Title 21: Food and Drugs, 2002. Appendix C to Part 101 -- Nutrition Facts for Raw Fruits and Vegetables.
7. Krauss RM, Eckel RH, Howard B, Lawrence JA, Daniels SR, Deckelbaum RJ, Erdman JW, Kris-Etherton P, Goldberg IJ, Kotchen TA, Lichtenstein AH, Mitch WE, Mullis R, Robinson K, Wylie-Rosett J, St. Jeor S, Suttie J, Tribble DL, and Bazzarre TL. Revision 2000: A Statement for Healthcare Professionals From the Nutrition Committee of the American Heart Association. J Nutr 131:132-146, 2001.
8. Byers T, Nestle M, McTiernan A, Doyle C, Currie-Williams A, Gansler T, Thun M. American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention: Reducing the risk of Cancer with Health Food Choices and Physical Activity. CA Cancer J Clin 52:92-119, 2002.
9. American Diabetes Association: Position Statement. Evidence-Based Nutrition Principles and Recommendations for the Treatment and Prevention of Diabetes and Related Complications. Diabetes Care 25:202-212, 2002.
10. Hu FB & Willett WC, Optimal diets for prevention of coronary heart disease. J Am Med Assoc 288:2569-2578, 2002.
11. Votruba SB, Atkinson RL, Schoeller DA. Prior exercise increases dietary oleate, but not palmitate oxidation. Obesity Research. 2003 Dec; 11(12): 1509-18.

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Boston, MA

AUG 27 2004

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The food issues think tank – promoting healthful, traditional and sustainable food choices

Gifford 1 of 9

To: Center for Nutrition Policy and Promotion
Re: Food Guidance System
(Notice, Federal Register 2004, page 42030, July 13, 2004
Fr: Oldways Preservation Trust

Thank you for your clear-language Federal Register notice soliciting comments on your proposed new Food Guidance System. Such direct language is truly a breath of fresh air.

This comment from Oldways has 4 sections that respond to your solicitation:

1. Rationale of Oldways comment (your sec. III).
2. Key concept underlying our proposed revision ("balance").
3. Concept for a compelling graphic.
4. Language for the requested "slogan" to accompany the graphic.

1. Rationale of Oldways Comment:

Your Notice forthrightly says: "Most Americans are familiar with the Food Guide Pyramid, but few follow its recommendations in their entirety."

A 1996 Cornell study provides data to support this: "Although 58 percent of Americans say they have heard of the USDA *Food Guide Pyramid*, only 13 percent say they understand it."

Much current anecdotal evidence makes clear that this 58 percent "recognition" of the Food Guide Pyramid is considerably higher in 2004, but your conclusion that "few follow its recommendations" remains accurate.

This disconnect raises many difficult issues to do with developing techniques that will be effective in bettering consumer food and drink consumption behaviors. One issue, however, can be disposed of relatively simply. This is whether to retain the classic pyramid shape for a food guide graphic, or to discard it.

The 1992 Bell Associates Report to USDA and HHS titled "Dietary Guidance Graphic Alternatives" was the evaluation that provided the basis for the pyramid shape of the 1992 Food Guide graphic. The analyses and conclusions of this Bell Associates remain valid today.

The Bell Report concludes: "The pyramid graphic was found to be most effective in conveying the messages of moderation and proportionality. The bowl design was found to be far less effective in promoting the moderation and proportionality messages, but did illustrate the variety messages somewhat better than the pyramid."

Pyramids convey durability and solidity. They are specifically proportionate, sitting on a broad base and ascending to a narrow peak. They allow for additional graphics in the spaces outside both sloping sides. They accommodate the regularity of the square or rectangle shape that best fits posters, newspapers, pamphlets, books and even television and computer screens.

Pyramids are, consequently, almost perfectly suited to a graphical representation of a food guide, because a key premise of food guides is that they convey clear understandings of proportionality. This is central to the concept of

assisting consumers to make sound food and drink choices that promote long-term health.

The rationale of this comment, then, is that the principle of a hierarchical pyramid shape remains the best hope for conveying graphically the written content of dietary guidelines.

It is worth noting the universality of this pyramid concept: many other countries have adopted a pyramid shape, or adapted its proportionality principles to familiar cultural icons. The Chinese food guide, for example, is in the shape of a pagoda.

2. "Balance" is key concept of Oldways proposed pyramid revision.

In order to motivate consumers effectively and successfully to follow dietary guidance, the graphic representation of the guidance must embrace a basket of what your Notice describes as "core messages."

The Notice describes these core messages as "directional statements" that are "intended to result in behavioral changes" and that will:

(a) "balance caloric intake with energy expenditure,"
(b) "promote nutrient dense food choices," and
(c) "lower chronic disease risks by lowering intake of saturated fats" and "other food components that are often consumed in excessive amounts."

In the interests of increasing the odds that the new Food Guide's graphics are successful in motivating changes in population-wide consumption behaviors, we urge you to simplify this construct. Because the "directional statements" are trying to do too much, it is likely that they will actually do too little, and will find themselves in a few years where the 1992 Food Guide Pyramid now finds itself: ineffective in moving Americans to healthy eating patterns.

Instead, we urge you to focus on a single concept. The only successful government campaign to modify American's eating habits was food rationing during World War II. The idea was simple: our fighting men and women needed good food, which meant those at home had to sacrifice. The years of food rationing campaigns played to this single theme: support the war effort.

The campaign against today's overweight and obesity, and unhealthy junk food, is often described as "The War Against Obesity." Unfortunately, the evidence is clear and overwhelming that we are losing this war. So, we must develop and implement new and tightly-focused strategies that have a high likelihood of success.

Oldways recommends that this new strategy focus on concept of "balance." Among the reasons for balance are these:

a. The need to balance calories in and calories out is not challenged.
b. A sound balance among macronutrients is not challenged, although the fine points of the most healthful proportions among macronutrients are a bitter battleground among promoters of competing theories, diets, diet books, and products).
c. A balance among food groups is not challenged.
d. A balance between desire for alcohol and sensible use of alcohol in not seriously challenged.
e. A balance in use of sugar and salt is not challenged.

In other words, balance is the key central concept for healthy consumption patterns. If it is adopted as the key central concept of the Food Guide Graphic, everything else will fall in line behind it with simple, easy-to-depict graphics and words that comport with its new slogan.

3. Concept for a compelling graphic.

The arguments that support a pyramid-shaped food guide graphic are well known. Absent compelling evidence to junk the pyramid shape, it is wise not to throw it out with the bath water and spend the time and funds to develop and introduce a new shape. After all, the pyramid is already widely recognized as a food guide, and so both prudence and common sense suggest that the wisest course is to refresh it with minor but meaningful adjustments.

The current official Food Guide Pyramid (1992) is a equilateral triangle (USDA/HHS Home and Garden Bulletin No. 232, Final Edition, 2000).

Oldways recommends retaining this familiar pyramid shape, but changing its proportions slightly and adding a platform. These small changes will not only freshen the current Food Guide Pyramid, but will make a big difference in improving its effectiveness. These slight changes are to flatten it a bit by widening its base, and adding a platform for it to rest upon.

Widening the base. The principal reason for this change is to accommodate a conceptual breakthrough which will allow the Food Guide graphic to convey the message long sought by nutritionists: that healthy eating and drinking patterns are based upon a balance among carbohydrates, proteins, and fats. With a wider base, the three macronutrient classes can fit alongside one another at the pyramid's base, unmistakably conveying that each is equally important for good health, but in differing proportions.

Consequently, Oldways recommends that the new Food Guide graphic remain triangular in shape, but that it adopt the proportions of the 4,750 year old great pyramid of Cheops in Egypt. This base of this Cheops pyramid is somewhat longer that the two sides, which has the effect of flattening it (see note just below for details).

In addition to the benefit of allowing the three macronutrients to form the base of the pyramid, as noted above, this reconfiguration allows more space alongside both sides of the pyramid to accommodate other messages and/or graphics. We recommend that fluids be included in one of these "side spaces," and that "non-nutrient" Dietary Guidelines messages be accommodated on the other. "Non-nutrient" messages include such subjects as food safety.

Adding a platform. We strongly urge that the entire pyramid rest upon a rectangular platform which depicts physical activity. Physical activity is of course not technically "food," but since this entire enterprise is about "food guides," and physical activity is intrinsically linked to both amounts and kinds of nutrition, it is escapist to avoid including a clear and distinct message about physical activity.

Oldways' traditional and food-culture-specific food pyramids have rested on a physical activity platform since 1997, and this innovation has been uniformly welcomed by the nutrition and dietetic communities. We have enclosed copies of Oldways pyramids which incorporate a platform for physical activity; we first did this in 1997.

We have attached examples of these Oldways pyramids for your information.

Adopting this comprehensive and logical approach will place the Dietary Guidelines and the Food Guide Graphic into a meaningful, compelling and scientifically-accurate package that will effectively persuade consumers to make changes.

(NOTE: The official US Food Guide Pyramid is an equilateral triangle; each of its three sides is the same length. The pyramid of Cheops is a four-sided solid each base of which is 775 feet long; each of its four sloping corners is 618 feet high.

This produces a "Cheops triangle" with a base 775 feet wide, and two sides 618 feet high. As a result, the Cheops triangle is "flatter" than the USDA triangle.)

4. Slogan

While we think it is premature to settle upon a final versions of a slogan or slogans until after the official version of the 2005 U.S. Dietary Guidelines for Americans are released, we are happy to suggest the following. However, we do urge you to make another request for slogan suggestions after the official Guidelines are made public.

Suggestion #1: **"Buy Into the Pyramid"**

This clear play on words suggests that *buying food and drink,* whether it be at a food market or a food service establishment, has large importance for diet healthfulness, since it is the step which precedes eating and drinking. It may, in fact, be more important than the "eating" step.

Suggestion #2: **"Live Life with the Pyramid"**

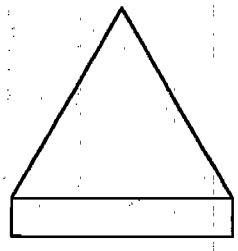
This, too, is a clear play on words. It suggests both (a) that the Pryamid should become a regular part of daily living, and (b) that it has a relationship to healthy living.

Both of these preliminary slogan language suggestions respond to the fact that only a small percentage of Americans use the Pyramid as a guide in closing the circle of ***purchase*** food/drink, ***consume*** food/drink. And, achieving closure of this circle is the goal we all seek.

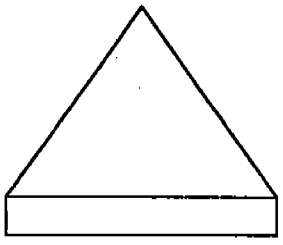
Thank you again for the clear guidance in your Notice.

K. Dunn Gifford

Oldways Preservation Trust
Boston, MA
September 26, 2004



Equilateral Pyramid



Cheops Pyramid

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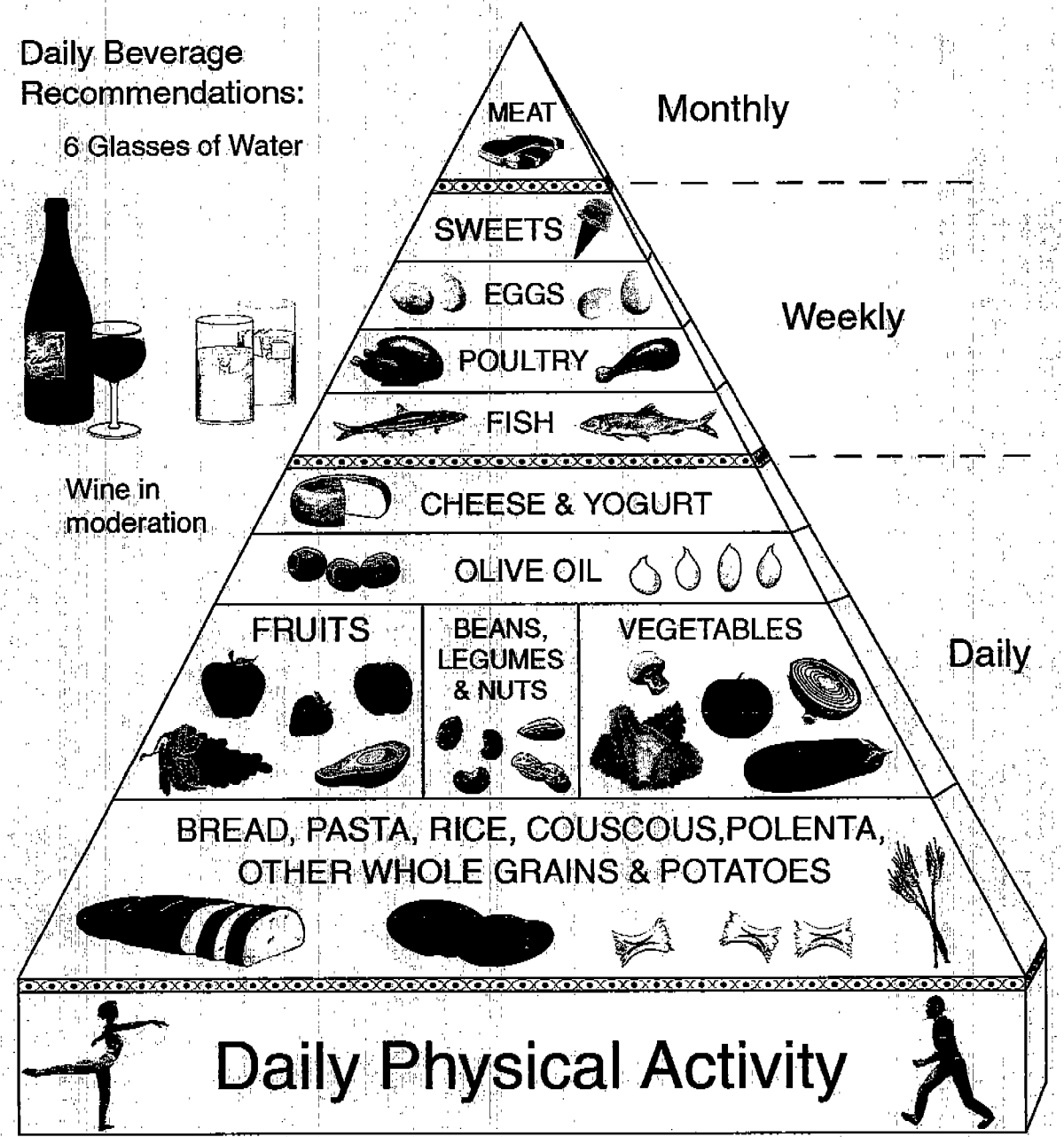
The Traditional Healthy Mediterranean Diet Pyramid



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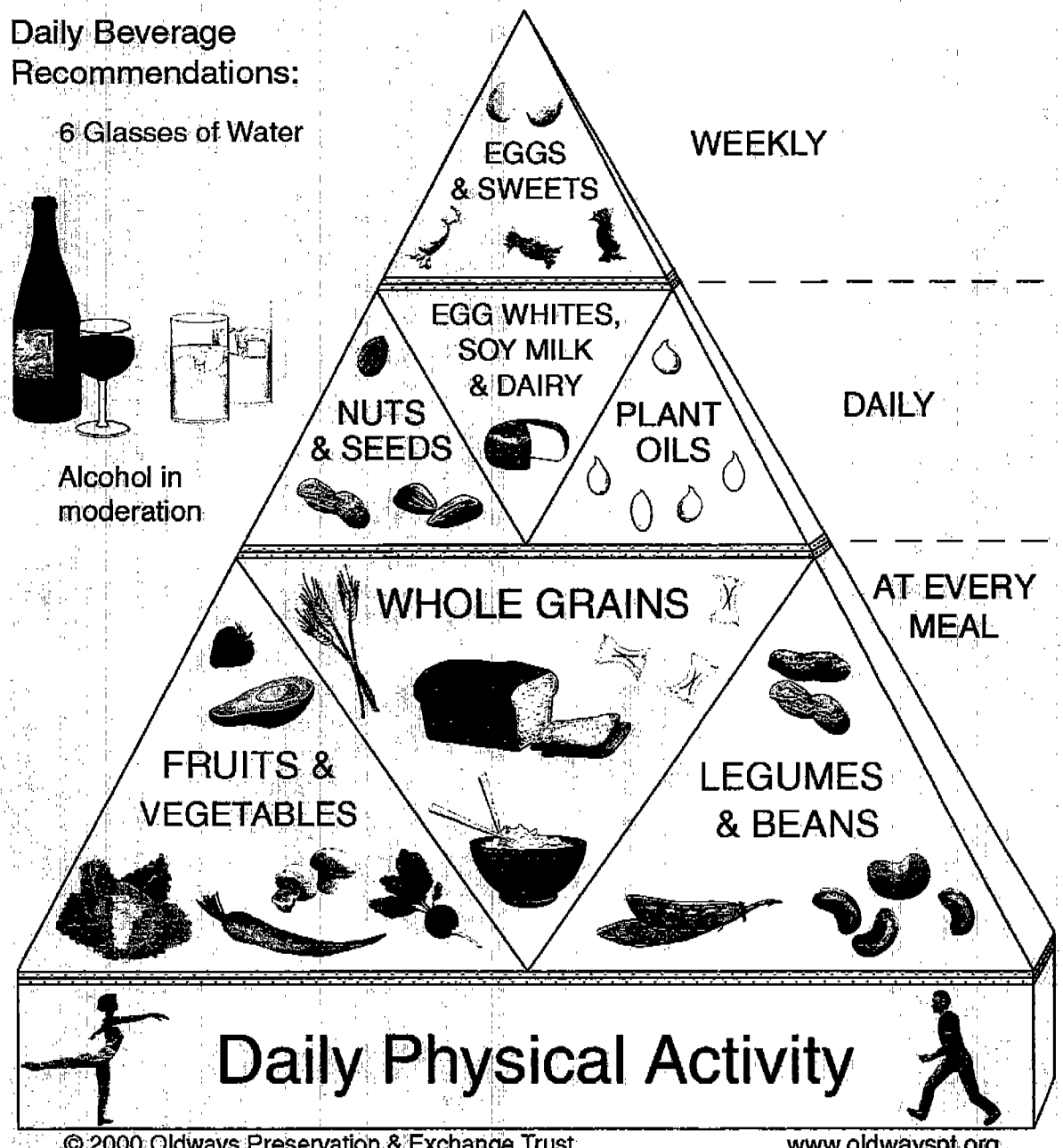
The Traditional Healthy Vegetarian Diet Pyramid



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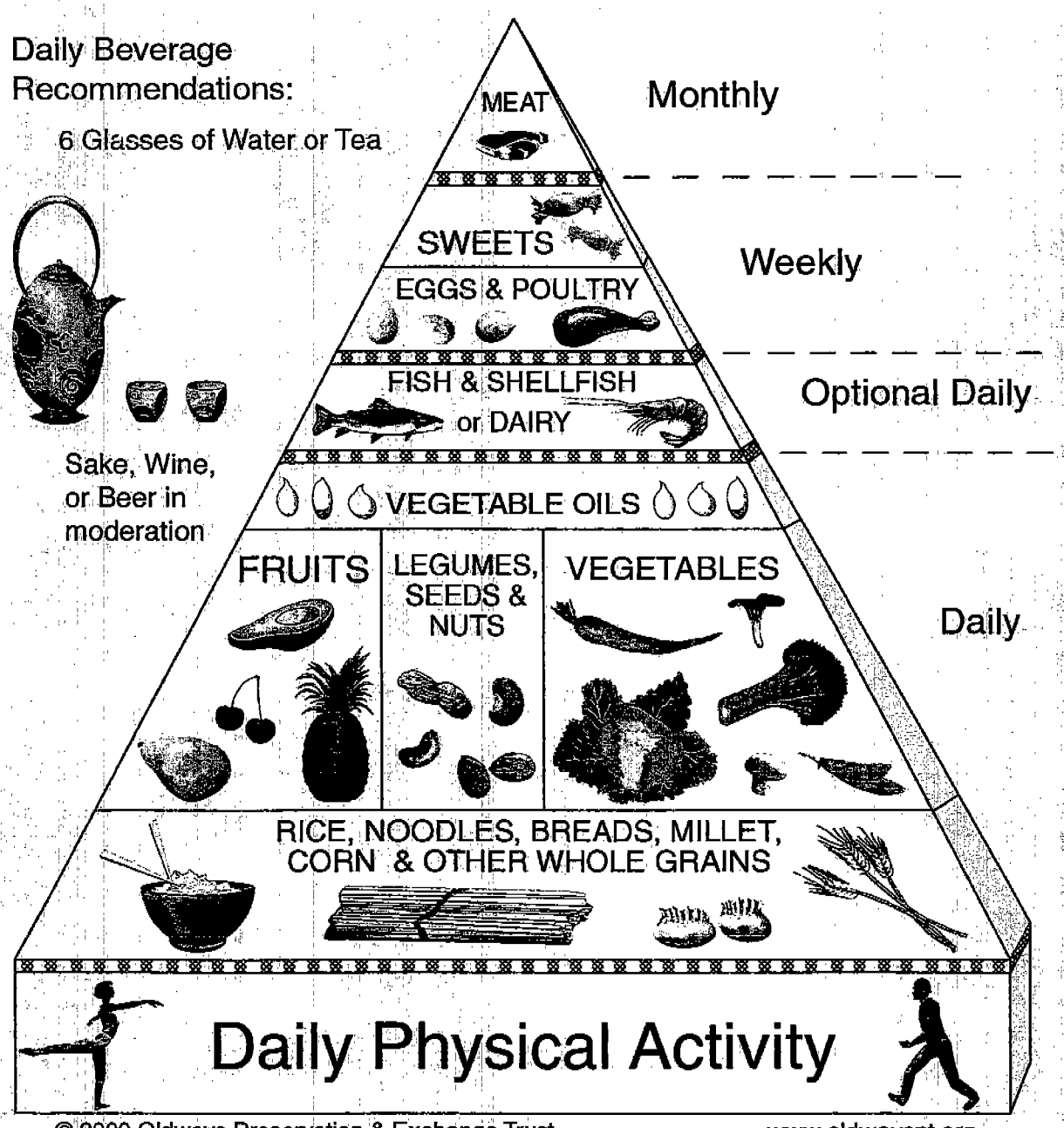
The Traditional Healthy Asian Diet Pyramid



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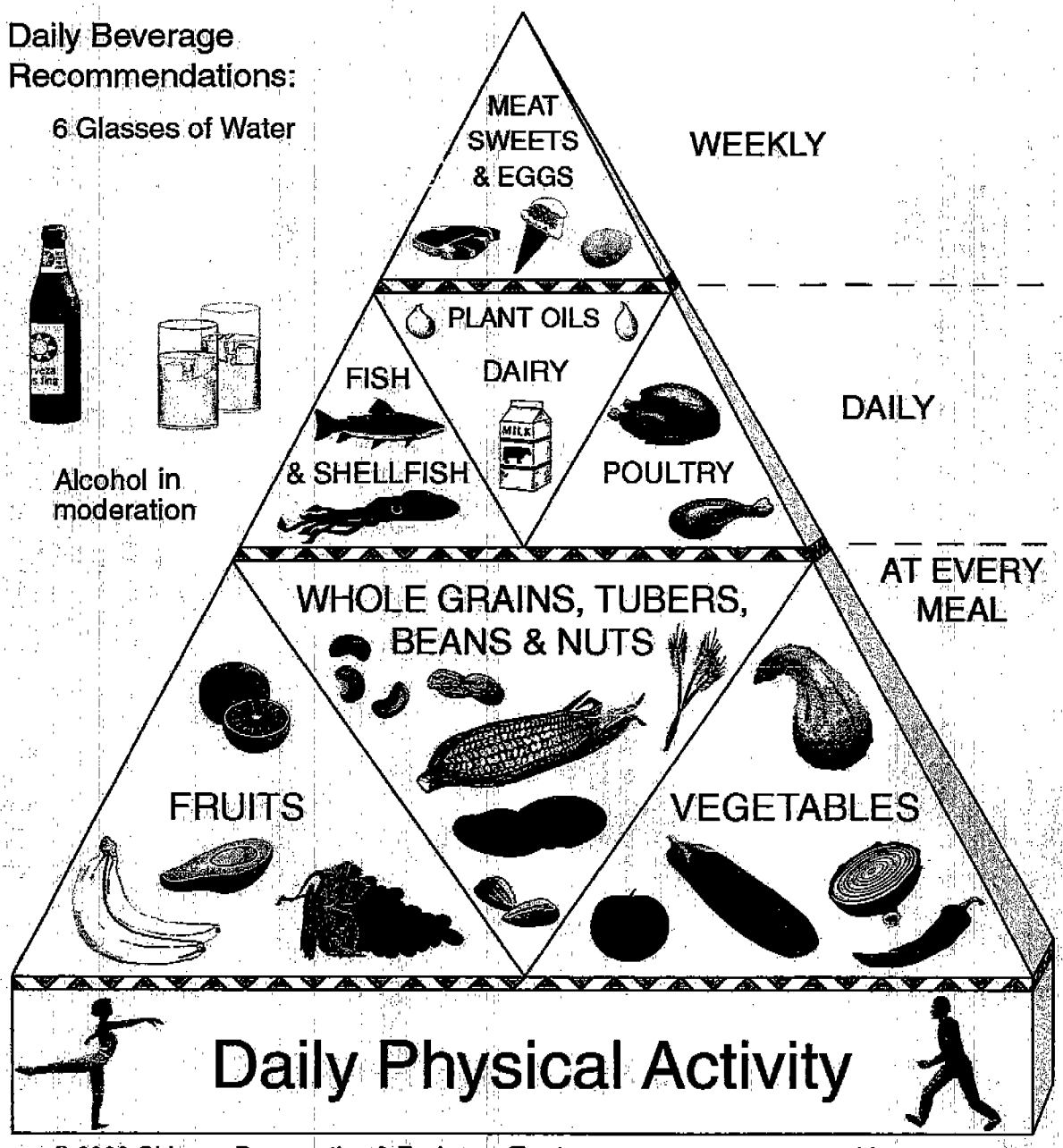
The Traditional Healthy Latin American Diet Pyramid



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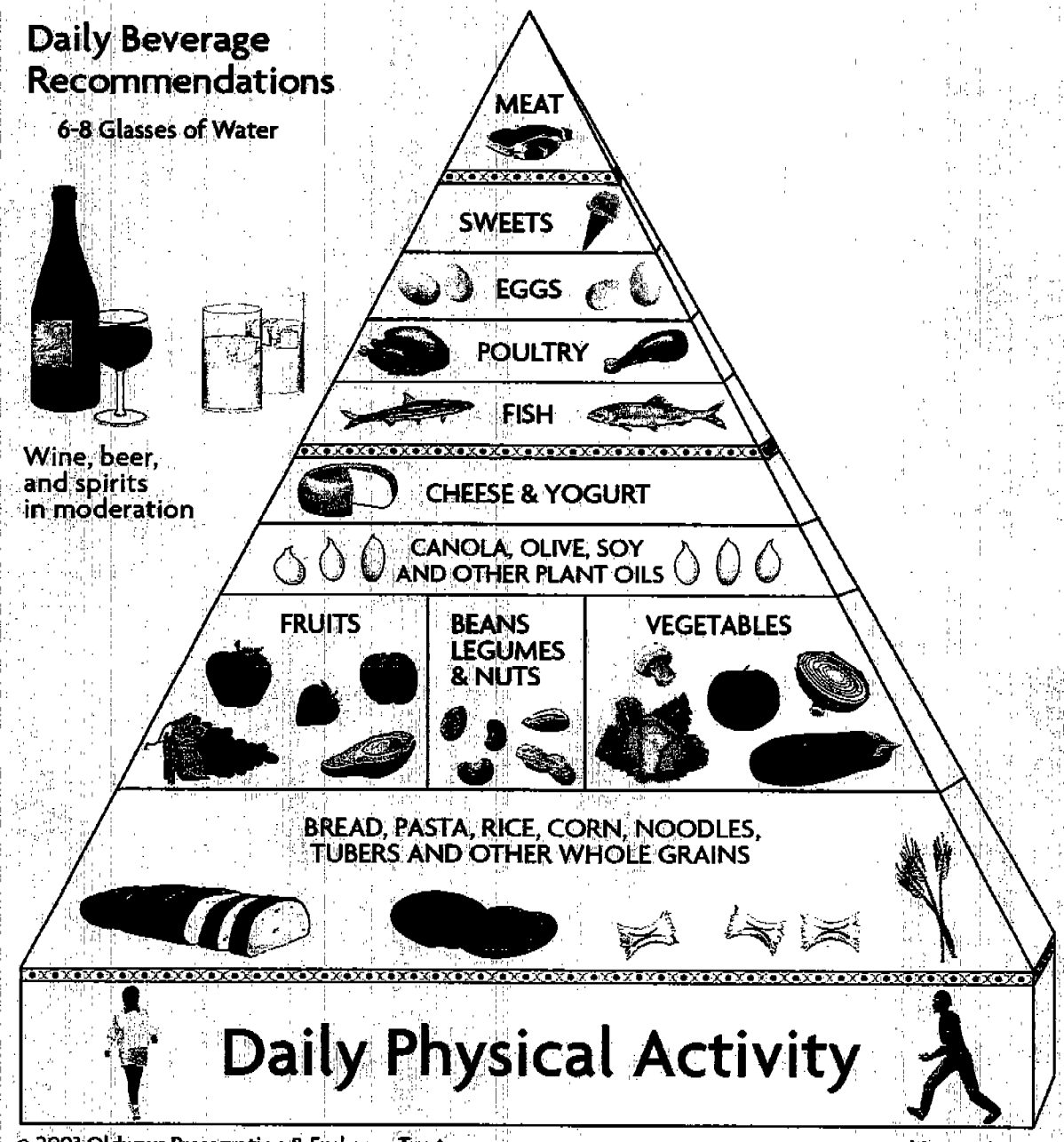
The EatWise Pyramid



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PCRM
PHYSICIANS COMMITTEE FOR RESPONSIBLE MEDICINE
WASHINGTON, DC
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John Webster
Director, Public Information and Governmental Affairs
Center for Nutrition Policy and Promotion
United States Department of Agriculture
3101 Park Center Drive, Room 1034
Alexandria, VA 22302

August 27, 2004

Dear Mr. Webster:

Thank you very much for inviting us to comment on the new Food Guidance System and the proposed new graphic, and for counting the Physicians Committee for Responsible Medicine (PCRM) among your stakeholders. We appreciate the opportunity to provide input into this important process. PCRM is a nonprofit organization that promotes preventive medicine, conducts clinical research, and encourages higher standards for ethics and effectiveness in research. We represent a broad base of doctors, dietitians, and other health professionals, as well as laypeople interested in nutrition and research issues.

With obesity at epidemic levels, and diseases such as diabetes, cancer and heart disease on the rise, the importance of communicating a healthy diet as means to promote health cannot be overstressed. Below, please find our comments to the USDA's questions regarding the proposed new graphic, as well as comments on the Food Guidance System.

Graphic

It is time for a bold new message and, consequently, a bold new graphic. Although, the food guide pyramid is widely recognized as a meal-planning guide it needs to be replaced. While Americans generally know of it, they clearly do not use it nor do they understand its more subtle messages. Fruits and vegetables and whole grains are seriously underconsumed, fiber intake is dismally low, and fat, sugar, and total calories are eaten in excess. Therefore, because the original information is not well understood and often goes unused, altering the messages contained within the same shape would likely provide no benefit. If we are to provide a new message as we should, then a new graphic will be necessary to communicate the very real change in dietary advice provided.

It is our hope that the USDA will create a new graphic to steer people towards food patterns that will promote health. An ideal graphic would show individuals what foods need to be increased to meet new IOM recommendations; specifically ways to increase fiber, potassium, and decrease saturated fat. And it would also illustrate what foods contain the saturated fat, cholesterol, salt, sugar, and excess calories we, as a population, need to avoid.

While the new food guidance system is complex and contains helpful new individualized information, it would be difficult and unwieldly to try to convey all of this information in a new graphic. Instead, we recommend that the graphic symbol depict basic important key messages that are congruent with the food guidance system. The simple messages again, would ideally be: build your diet from whole plant foods, the fruits, vegetables, whole grains, and beans while limiting or avoiding fatty, sugary, salty foods including animal products, sugary beverages, sweets, and other foods that provide unnecessary and, therefore, discretionary calories. For those who wish more detailed information, the food guidance system should be readily accessible via the web and other avenues.

A graphic that depicts these simple messages would have the advantage of providing guidance when people are most likely to be interested in such information; at the grocery store. A simple educational graphic would have the advantage of being accessible at the point-of-sale, and allowing individuals to visualize where the foods purchased fit into either a more or less healthful eating pattern.

A graphic depicting these two simple messages could take a variety of forms. One suggestion may be a graphic that looks like a dinner plate, which contains the types of foods that promote health; whole grains, fruits, vegetables and legumes. Discretionary calories could be placed to the side as on a dessert plate, and include foods that contain the higher amounts of fat and cholesterol in the typical American diet, such as meat, eggs and dairy products, as well as refined and sugary items such as baked goods and soda. Alternatively, the image could be of a bushel basket or garden overflowing with delicious looking plant foods, with an inset of the foods to be limited indicated by circle with a line through it. Or, a cartoon of a strong person holding an armful of fresh produce and other plant foods standing on a podium that is squishing images of foods containing discretionary calories could also convey this message. The key point is that whatever the image, these two simple core messages should come through loud and clear.

Core Messages

Core messages should be focused, food-based messages, rather than nutrient messages. Experience has shown that the average American does not have a good grasp of what carbohydrates, proteins or a fats are nor what foods contain each. Diet fads have also interceded to confuse the public's perceptions of these nutrients. Foods, when explicitly identified, however, are more recognizable and less prone to misinterpretation.

The core messages should demonstrate a healthy food pattern that promotes health, protects against disease, and aids in helping people maintain or achieve a healthy body

weight. A pattern that encourages nutrient-dense, but not calorie-dense foods should be promoted, as well as a pattern that will help Americans meet the IOM's increased requirements for fiber and potassium, and the call to decrease saturated fat and limit calories.

Foods that fit this pattern are primarily plant-based and include whole grains, fruits, vegetables and legumes. Foods higher in calories, fat, cholesterol, such as meat, dairy products and eggs, as well as foods that contain "empty calories" such as sugar, should be considered discretionary.

Rationale for Core Messages

Whole-grain foods should be considered part of the healthy food pattern, because they can be an important source of fiber in the diet and contain nutrients that refined grains do not. Refined grains and refined grain products are also often components of sugary, processed foods and baked goods, such as cakes and donuts, which contribute empty calories to the diet. Refined grains should therefore be considered discretionary.

Currently, people in the United States are only eating between 12 and 15 grams of fiber a day, far less than the IOM recommendations of 20 to 35 grams.[1] An easy way to boost fiber intake is to switch from refined grains to whole-grain foods. People who consume more whole grains are at lower risk of developing coronary heart disease, stroke, cancer, and diabetes,[2] and women who consume more whole grains than refined grains have a lower mortality rate than women who favor refined grains.[3] Inversely, consumption of refined grains has been associated with a higher risk of heart disease[4] and with some forms of cancer.[5]

Increasing fruit and vegetable intake would have profound, improved health implications in Americans. These foods provide vitamins, minerals, fiber and protein, while contributing no cholesterol and very little fat, especially saturated fat, to the diet. Increased consumption of fruits and vegetables is widely known to decrease the risks of many diseases.

When considering protein sources, plant sources should be highlighted in the healthy food pattern, while animal sources should be discretionary. Animal sources are not required by the body, and tend be much higher in cholesterol and saturated fat, while containing no fiber. Emphasizing plant protein sources in the new food guidance system could have tremendous positive effects on health. For example, one study showed that people who adopted a vegetarian diet reduced their saturated fat intake by 26 percent and achieved a significant drop in cholesterol levels in just six weeks.[6] Besides the low levels of saturated fat and absence of cholesterol in plant protein sources, vegetable protein also helps decrease the risk for heart disease. Studies have shown that replacing animal protein, such as casein, with soy protein reduces blood cholesterol levels even when the total amount of fat and saturated fat in the diet remains the same.[7-8]

While the elimination of meat protein has health-promoting attributes, the inclusion of beans and nuts in the diet also has important health benefits. For example, research from the Physicians' Health Study at Harvard has found that nut consumption is associated with a decrease in risk of total coronary heart disease death, particularly sudden cardiac death.[9] A reduction in the risk of coronary heart disease is also seen with legume consumption as reported in the NHANES I Epidemiologic Follow-up Study.[10]

Diets heavy in animal protein versus plant protein can cause an increase in bone loss, which can lead to osteoporosis, and an increase in kidney stone formation. Animal protein tends to leach calcium from the bones, leading to its excretion in the urine. International comparisons show a strong positive relationship between animal protein intake and fracture rates. These findings are supported by clinical studies showing that high protein intakes aggravate calcium losses. A 1994 report in the *American Journal of Clinical Nutrition* showed that when animal proteins were eliminated from the diet, calcium losses were cut in half.[11] Another recent research study found that subjects consuming a diet high in animal protein for as little as six weeks had a significant decrease in estimated calcium balance.[12]

Also, the American Academy of Family Physicians notes that high animal protein intake is largely responsible for the high prevalence of kidney stones in the United States and other developed countries and recommends protein restriction for the prevention of recurrent nephrolithiasis.[13] In part, this is because protein ingestion increases renal acid secretion, calcium resorption from bone, and a reduction in renal calcium resorption. In addition, animal protein is a major dietary source of purines, the major precursors of uric acid and an important factor in some stone formers. When uric acid builds up, especially in an acid environment, it can precipitate uric acid stone formers and decrease the solubility of calcium oxalate, a problem for calcium stone formers.[13] Studies have shown that consumption of beans, particularly soybeans, have been associated with both cardiovascular and renal benefits.[14]

Emphasizing this protein group discourages the consumption of foods that have been linked to colon cancer and encourages foods that have been associated with a reduction in colon cancer risk. Colorectal cancer is one of the most common forms of cancer and is among the leading causes of cancer-related mortality. Long-term high intake of meat, particularly red meat, is associated with significantly increased risk of colorectal cancer. The 1997 report of the World Cancer Research Fund and American Institute for Cancer Research, Food, Nutrition, and the Prevention of Cancer, reported that, based on available evidence, diets high in red meat were considered probable contributors to colorectal cancer risk. In addition, diets high in animal protein are typically low in dietary fiber. Fiber facilitates the movement of wastes, including intralumenal carcinogens, out of the digestive tract, and promotes a biochemical environment within the colon that appears to be protective against cancer.[15]

Scientific evidence no longer supports a broad-based recommendation to consume dairy products. Dairy has been promoted as an essential food group, largely because of calcium content. However, all essential nutrients found in dairy products can be found in

numerous non-dairy sources, such as beans, dark leafy greens, fortified cereals, juices, and non-dairy milk alternatives. These plant-based products also have the advantage of containing no cholesterol and less saturated fat. Therefore, dairy products should be considered discretionary foods.

More importantly, dairy product consumption and calcium intake has been linked to an increased risk of prostate cancer. Prostate cancer is the fourth most common malignancy among men worldwide, with an estimated 400,000 new cases diagnosed annually, accounting for 3.9 percent of all new cancer cases.[16] Epidemiologic evidence strongly suggests that dietary factors play a major role in prostate cancer progression and mortality, with protective effects associated with consumption of fruit (particularly tomatoes), vitamin E, and selenium, and increased risk linked to dairy products, meat, and fat.[17] Dairy product consumption has been associated with prostate cancer risk in divergent populations, and several studies have investigated mechanisms that may explain these findings.

Five of eleven cohort studies on dairy's effect on prostate cancer have found significant associations between milk or dairy product consumption and prostate cancer incidence or mortality,[18-22] while six studies found no association between milk or dairy product use generally and prostate cancer incidence or mortality.[23-28] For example, in the Health Professionals Follow-Up Study, a cohort of U.S. male dentists, optometrists, osteopaths, pharmacists, and veterinarians, the relative risk of advanced prostate cancer associated with daily consumption of more than two glasses of milk, compared to zero, was 1.6 (95% CI, 1.2-2.1, $P_{trend} = 0.002$). For metastatic disease, relative risk was 1.8 (95% CI, 1.2-2.8, $P_{trend} = 0.01$). Of the milk consumed, 83 percent was skim or low-fat.[29] In the Physicians' Health Study cohort, consumption of two and one-half dairy servings daily was associated with increased risk of prostate cancer, compared to having less than one-half serving daily (RR 1.34, 95% CI: 1.04,1.71), after adjustment for age, smoking, exercise level, and body mass index (BMI).

Also, new research casts grave doubt on the long-standing but poorly supported notion that dairy product consumption protects against bone loss. In countries where dairy products are not generally consumed, osteoporosis is less prevalent than in the United States. Studies have shown little effect of dairy products on osteoporosis.[30] The Harvard Nurses' Health Study followed 78,000 women for a 12-year period and found that milk did not protect against bone fractures. Indeed, those who got the most calcium from dairy sources had more fractures than those who rarely drank milk.[31] In one of the most comprehensive reviews on the effect of dairy products on bone health, Weinseir and Krumdieck examined 57 research studies. In this review, 53 percent of the studies found results that were not significant, 42 percent found favorable results, and 5 percent found unfavorable results. The researchers concluded that there was not enough evidence to recommend dairy consumption for bone health to males, members of minority groups, or women over 30.[32] What has been supported by scientific evidence, however, is that fruit and vegetable intakes have a positive effect on bone health. A study published in the *American Journal of Clinical Nutrition* shows that higher intakes of fruits and vegetables throughout the teen years improve bone density in adulthood.[33]

Individualized vs. General Messages

Individualized messages are an appropriate and welcome change, as long as the system is set up to accommodate a wide variety of preferences and options, and that these individualized messages are in accordance with the overall core message, which is to promote a healthy food pattern.

Allowing people to enter BMI and activity level and to receive a personalized calorie requirement should prove to be very informative and help people realize their caloric needs.

A complication may arise in the content of individualized food-based messages. Nutrient requirement messages are generally uniform within a given age range, however there are multiple means (and some healthier than others) by which to obtain these nutrients. The individualized messages should provide an array of food choices that promote nutrient and fiber intake, while remaining low in calories, fat, especially saturated fat, and cholesterol. A wide array of choices will allow individuals with specific health conditions, allergies, or religious, vegetarian, or taste preferences to choose appropriate foods.

Recommended general guidance messages:

- Consumption of a wide variety of unrefined, whole, plant-based foods, such as whole grains, fruits, vegetables and beans/legumes provides the body with all essential nutrients, and represents an eating pattern that promotes good health, disease prevention and aids in achieving and maintaining a healthy body weight.

- Foods that are calorie-dense, high in saturated fat and cholesterol, and low in fiber, such as meat, eggs and dairy products, as well as sugary foods, are discretionary.

Individualized guidance:

Individualized guidance (including the food patterns recommended in the new food guidance system) should fit within the generalized guidelines, which promote plant-based foods for health. To ensure the healthiest food options are presented, it is essential that the food guidance system recognize plant-based foods as choices for meeting nutrient requirements. Ideally, meat, dairy and other fat-laden products that would be considered the alternatives (labeling them as discretionary will aid in this.)

Examples:

- To increase calcium intake, use plant-based options such as dark leafy greens, beans, fortified orange juice, as well as fortified rice, almond and soy milks.

- To cut saturated fat and cholesterol and increase fiber intake will meeting protein needs, use beans (garbanzo, kidney, black, white, pinto, etc.), peas, lentils, whole grains, and tofu or other soy or wheat based veggie "meats".
- To increase iron intake, eat plenty of green leafy vegetables (kale, collards, spinach, mustard or beet greens, broccoli, etc.) and beans (garbanzo, kidney, black, white, pinto, etc.).

It is imperative that at least one version of the individualized food guidance system be based entirely on plant foods to promote long term health and to meet the needs of vegetarians, vegans, individuals with milk allergy or lactose intolerance, or individuals with religious preferences that exclude one or more animal products.

Channels of Delivery

The internet is an inexpensive, easy, and effective way to distribute information and it has the potential benefit of being interactive. Therefore, it certainly is one good channel of delivery of these messages, however it will NOT reach everyone. Elder individuals and low-income populations are less likely to have access. Content would also need to be available in Spanish and perhaps other languages that are spoken by a significant number of individuals in the US.

Use of the radio and television is an effective way to reach a very broad audience. Certainly food manufacturers have utilized this channel of delivery to shape eating habits of individuals in the US. Catchy, strong, public service announcments delivered via television and radio could be utilized to help brand the new graphic, and also to demonstrate a healthy eating pattern.

In addition, we recommend the development of print materials that could be made available in grocery stores, some government offices, and doctor offices.

Point-of-purchase information should also be available. Foods that fall into the healthy eating pattern should be branded with the new graphic. "Sub" graphics could also be created to represent foods within the pattern (whole grains, fruits, vegetables, beans/legumes) and placed on the appropriate food items. Separate, differently colored graphics representing "discretionary" items can be created and placed on those respective items, and could potentially serve as mild warnings regarding the need to limit the consumption of these foods.

Types of Information

Not everyone will seek detailed, individualized information, and there may be occasions where it is not feasible to provide individualized information, such as at a grocery store. Basic information should be readily available on the internet, in print form, and visible at the point-of-purchase. Examples of beneficial, basic information are as follows:

Internet and print materials

- The new graphic demonstrating a healthy eating pattern should be very visible to encourage "branding". Foods that fit into the healthy eating pattern (whole grains, vegetables, fruits and beans/legumes) could be listed, as individuals are likely unaware of the many foods available. Key nutrients available in these foods could also be highlighted.
- A list and pictures/graphics of the discretionary foods that are to be limited (meat, eggs, dairy products, soda and other fatty or sugary foods).
- A BMI calculator or chart, with an explanation of the numbers would be helpful for people to start thinking about what personalized information they may need to achieve a healthy weight.
- Sample menus, using foods acceptable to different cultural and religious groups.
- Tips for eating out; foods to look for and foods to avoid.
- Brief statements on how plant foods can affect diabetes, high blood pressure, lower cholesterol.

Point-of-Purchase Information

- The new graphic should be placed on or near products to illustrate that the specific food fits within a healthy eating pattern. In the case of fresh produce, key nutrients can be posted near the foods.
- Products considered to fall into the discretionary calories category should also be identified as foods to be limited in a healthy diet.

A new graphic that offers a clear and bold message to encourage the increased intake of fruits, vegetables, grains and legumes, while identifying fatty, sugary and salty foods as discretionary and discouraging consumption of these foods, will aid in setting Americans back on the road to wellness. The food guidance system, designed to support these messages, will be an invaluable tool for combating disease and promoting health.

Thank you again for the opportunity to weigh in on these important issues, and if we may be of any further assistance, please do not hesitate to contact me via phone at 919-306-5162 or email: alanou@pcrm.org.

Respectfully submitted,

Amy Joy Lanou

Amy Joy Lanou, Ph.D.
Nutrition Director

1. Slavin J. Implementation of dietary modifications. Am J Med 1999;106:46S-51S.

2. Jones JM, Reicks M, Adams J, Fulcher G, Weaver G, Kanter M, Marquart L. The importance of promoting a whole grain foods message. J Am Coll Nutr 2002;21:293-7.

3. Jacobs DR, Pereira MA, Meyer KA, Kushi LH. Fiber from whole grains, but not refined grains, is inversely associated with all-cause mortality in older women: the Iowa women's health study. J Am Coll Nutr 2000;19:326S-30S.

4. Liu S, Buring JE, Sesso HD, Rimm EB, Willett WC, Manson JE. A prospective study of dietary fiber intake and risk of cardiovascular disease among women. J Am Coll Cardiol 2002;39:49-56.

5. Chatenoud L, La Vecchia C, Franceschi S, Tavani A, Jacobs DR Jr, Parpinel MT, Soler M, Negri E. Refined-cereal intake and risk of selected cancers in Italy. Am J Clin Nutr 1999;70:1107-10.

6. Masarei JR, Rouse IL, Lynch WJ, Robertson K, Vandongen R, Beilin LJ. Vegetarian diet, lipids and cardiovascular risk. Aust NZ J Med 1984;14:400-4.

7. Carroll KK, Giovannetti PM, Huff MW, Moase O, Roberts DC, Wolfe BM. Hypocholesterolemic effect of substituting soybean protein for animal protein in the diet of healthy young women. Am J Clin Nutr 1978;31:1312-21.

8. Tonstad S, Smerud K, Hoie L. A comparison of the effects of 2 doses of soy protein or casein on serum lipids, serum lipoproteins, and plasma total homocysteine in hypercholesterolemic subjects. Am J Clin Nutr 2002;76:78-84

9Albert CM, Gaziano JM, Willett WC, Manson JE. Nut consumption and decreased risk of sudden cardiac death in the Physicians' Health Study. Arch Intern Med 2002;162(12):1382-7.

10 Bazzano LA, He J, Ogden LG, Loria C, Vupputuri S, Myers L, Whelton PK. Legume consumption and risk of coronary heart disease in US men and women: NHANES I Epidemiologic Follow-up Study. Arch Intern Med 2001;161:2573-8.

11. Remer T, Manz F. Estimation of the renal net acid excretion by adults consuming diets containing variable amounts of protein. Am J Clin Nutr 1994;59:1356-61.

12. Reddy ST, Wang CY, Sakhaee K, Brinkley L, Pak CY. Effect of low-carbohydrate high-protein diets on acid-base balance, stone-forming propensity, and calcium metabolism. Am J Kidney Dis 2002;40:265-74.

13. Goldfarb DS, Coe FL. Prevention of recurrent nephrolithiasis. Am Fam Physician 1999;60:2269-76

14. Anderson JW, Smith BM, Washnock CS. Cardiovascular and renal benefits of dry bean and soybean intake. Am J Clin Nutr 1999;70:464S-74S.

15. World Cancer Research Fund/American Institute for Cancer Research. Food, Nutrition, and the Prevention of Cancer: a global perspective. World Cancer Research Fund/American Institute for Cancer Research, Washington, DC, 1997, pp. 216-51.

16. Weinsier RL, Krumdieck CL. Dairy foods and bone health: examination of the evidence. Am J Clin Nutr 2000;72:681-9.

17Chan JM, Stampfer MJ, Giovannucci EL. What causes prostate cancer? A brief summary of the epidemiology. Sem Canc Biol 1998;8:263-73.

18. Snowdon DA, Phillips RL, Choi W. Diet, obesity, and risk of fatal prostate cancer. Am J Epidemiology 1984;120:244-50.

19. LeMarchand L, Kolonel LN, Wilkens LR, Myers BC, Hirohata T. Animal fat consumption and prostate cancer: a prospective study in Hawaii. Epidemiology 1994;5:276-82.

20. Giovannucci E, Rimm EB, Wolk A, Ascherio A, Stampfer MJ, Colditz GA, Willett WC. Calcium and fructose intake in relation to risk of prostate cancer. Cancer Res 199a;58:442-7.

21 Schuurman AG, van den Brandt PA, Dorant E, Goldbohm RA. Animal products, calcium and protein and prostate cancer risk in the Netherlands Cohort Study. Br J Cancer 1999;80:1107-1113.

22. Chan JM, Stampfer MJ, Ma J, Gann PH, Gaziano JM, Giovannucci E. Dairy products, calcium, and prostate cancer risk in the Physicians' Health Study. Am J Clin Nutr 2001;74:549-54.

23 Hirayama T. Epidemiology of prostate cancer with special reference to the role of diet. Natl Cancer Inst Monogr 1979;53:149-55.

24. Mills PK, Beeson WL, Phillips RL, Fraser GE. Cohort study of diet, lifestyle, and prostate cancer in Adventist men. Cancer 1989;64:598-604.

25. Severson RK, Nomura AMY, Grove JS, Stemmermann GN. A prospective study of demographics, diet, and prostate cancer among men of Japanese ancestry in Hawaii. Cancer Res 1989;49:1857-60.

26. Thompson MM, Garland C, Barrett-Connor E, Khaw KT, Friedlander NJ, Wingard DL. Heart disease risk factors, diabetes, and prostatic cancer in an adult community. Am J Epidemiol 1989;129:511-7.

27. Hsing AW, McLaughlin JK, Schuman LM, Bjelke E, Gridley G, Wacholder S, Co Chien HT, Blot WJ. Diet, tobacco use, and fatal prostate cancer: results from the Lutheran brotherhood cohort study. Cancer Res 1990;50:6836-40.

28. Veierød MB, Laake P, Thelle DS. Dietary fat intake and risk of prostate cancer: a prospective study of 25,708 Norwegian men. Int J Cancer 1997;73:634-8.

29. Giovannucci E, Rimm EB, Wolk A, Ascherio A, Stampfer MJ, Colditz GA, Willett WC. Calcium and fructose intake in relation to risk of prostate cancer. Cancer Res 199a;58:442-7.

30 Riggs BL, Wahner HW, Melton J, Richelson LS, Judd HL, O'Fallon M. Dietary calcium intake and rates on bone loss in women. J Clin Invest 1987;80:979-82.

31. Feskanich D, Willett WC, Stampfer MJ, Colditz GA. Milk, dietary calcium, and bone fractures in women: a 12-year prospective study. Am J Publ Health 1997;87:992-7.

32. Weinsier RL, Krumdieck CL. Dairy foods and bone health: examination of the evidence. Am J Clin Nutr 2000;72:681-9.

33. New SA, Bolton-Smith C, Grubb DA, Reid DM. Nutritional influences on bone mineral density: a cross-sectional study in premenopausal women. Am J Clin Nutr 2001;41:225-49.

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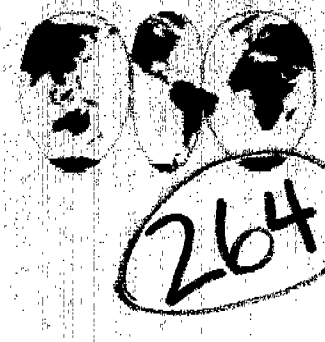

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August 26, 2004

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Food Guide Pyramid Reassessment Team
USDA Center for Nutrition Policy and Promotion
3101 Park Center Drive,
Room 1034
Alexandria, VA 22302

Dear Food Guide Reassessment Team:

On behalf of the members and the board of the Weston A. Price Foundation, we are pleased to submit our comments on the USDA Food Guidance System/ Food Guide Pyramid. These comments are in response to the Federal Register Notice, vol. 69, No. 133, dated Tuesday July 13, 2004, page 42030.

If you have any questions, you may contact the Foundation at 202 333-HEAL or westonaprice_contact@msn.com. Our website is www.westonaprice.org.

Thank you.

Sincerely yours,

Bill Sanda

Bill Sanda
Director of Public Affairs
Weston A. Price Foundation

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Comments on the Food Guidance System/ Food Guide Pyramid

U. S. Department of Agriculture
Center for Nutrition Policy and Promotion

Submitted by the Weston A. Price Foundation

Sally Fallon, President
Mary Enig, Ph.D., Vice President and Science Advisor
Bill Sanda, Director of Public Affairs

August 26, 2004

WESTON A. PRICE FOUNDATION
WASHINGTON, DC
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Recommendations

The Weston A. Price Foundation makes the following recommendations:

- **Abandon the current Food Pyramid concept;**
- **Return the Dietary Guidelines to a plan that stresses high quality foods from four basic groups;**
- **Urge avoidance of processed foods containing refined and partially hydrogenated vegetable oils, highly sugared food, especially those foods containing high fructose corn syrup as well as foods containing refined highly processed protein isolates;**
- **Encourage use of beneficial unprocessed, unrefined saturated and monounsaturated fats and oils;**
- **Limit added sugars to no more than 10 percent of daily caloric intake.**

Recommended Guidelines: Everyday, eat high quality, unprocessed foods from each of the following four groups:

- ***Animal foods: meat, poultry, fish, eggs and whole milk products***
- ***Grains and legumes: whole grain baked goods, breakfast cereals, beans***
- ***Fruits and Vegetables: preferably fresh or frozen***
- ***Fats and Oils: unrefined saturated and monounsaturated fats including butter and other animal fats, palm oil and coconut oil, olive oil and peanut oil***

Eat sparingly: sweets, white flour products, soft drinks, processed foods, polyunsaturated and partially hydrogenated vegetable oils and fried foods

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Executive Summary

According to a USDA study on nutrition, major health issues are diet related and the solution to illness can be found in nutrition. The real potential from improved diet is preventative in that it may defer or modify the development of a disease state. These findings are corroborated by Surgeon General C. Everett Koop's 1988 Report on Nutrition and Health.

Fifty years ago, grocery stores stocked about 200 items. Seventy percent of those were grown, produced or processed within a 100-mile radius of the store. Today, the average supermarket carries 50,000 food items or more; most of these foods are highly processed and refined, most of which are transported thousands of miles to their final destination. Americans spend over 90 percent of their food dollars on these processed foods - foods that contain high levels of refined sugars, high fructose corn syrup, refined polyunsaturated oils and *trans* fatty acids, excitotoxins such as MSG and aspartame, as well as highly processed protein isolates. The reduction in nutrients in these foods requires that we eat more to satisfy the body's nutritional requirements.

The current Food Pyramid strongly favor a low-fat, high-carbohydrate diet. The caloric proportions of proteins, fats and carbohydrates advocated by USDA's Food Pyramid and Dietary Guidelines are alarmingly similar to the USDA guidelines for fattening cattle and other livestock.

Only during the last century has man's diet included a high percentage of refined carbohydrates. Our ancestors ate fruits, vegetables and grains in their whole, unrefined state. In nature, sugars and carbohydrates—the energy providers—are linked together with vitamins, minerals, enzymes, protein, fat and fiber—the bodybuilding and digestion-regulating components of the diet. In whole form, carbohydrates support life, but refined carbohydrates are inimical to life because they are devoid of bodybuilding elements.

There is no conclusive evidence from epidemiologic studies that dietary fat intake promotes the development of obesity independently of total energy intake. Many researchers now recognize that one of the most important factors in preventing weight gain involves the total amount of calories consumed; when a significant portion of these calories come from healthy fats, the body experiences satiety and overall caloric intake is reduced.

During the early 20th century, most of the fatty acids in the diet were either saturated or monounsaturated, primarily from butter, lard, tallows, coconut oil and small amounts of olive oil; heart disease and obesity were virtually non-existent. Today, most of the fats in our diet are polyunsaturated, primarily from vegetable oils derived from soy, corn, safflower, sunflower, cottonseed and rape seed (canola – primarily monounsaturated).

Polyunsaturated fatty acids are very fragile. When exposed to heat and oxygen, as during commercial processing, they form free radicals and other harmful breakdown products that damage the human body in many ways. *Trans* fatty acids in the diet,

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created from partially hydrogenating vegetable oils, have been implicated as causing or exacerbating most of our modern diseases, including heart disease, cancer, diabetes, obesity, immune dysfunction and bone loss. In addition, a number of researchers have argued that along with a surfeit of omega-6 essential fatty acids from vegetable oils the American diet is deficient in the more unsaturated omega-3 linolenic acid.

Animal fats, such as butter, lard and tallows, as well as fruit/nut-derived saturated fats – coconut and palm oils - are stable, do not easily develop free radicals, and contain nutrients that are vital for good health. Children, in particular, require high levels of quality animal fats, such as butter and whole milk products, to achieve optimal physical and neurological development.

Naturally occurring unprocessed fruits, vegetables, whole grains and legumes with non-factory farmed animal and fish protein sources are recommended for longevity and well being. Beneficial fats include the primarily saturated butter and other animal fats, coconut and palm oils; monounsaturated fats such as olive oil and peanut oil; and the polyunsaturated omega-3 essential fatty acid from flaxseed oil and fish.

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The Weston A. Price Foundation

The Weston A. Price Foundation is a nonprofit, tax exempt food and nutrition education organization founded in 1999. The Foundation is dedicated to restoring nutrient-dense foods to the American diet through education, research and activism.

One of our goals is to disseminate the research of nutrition pioneer Dr. Weston Price, whose studies of isolated non-industrialized peoples established the parameters of human health and determined the optimum characteristics of human diets. Dr. Price's research demonstrated that humans achieve optimal physical form and health generation after generation only when they consume nutrient-dense whole foods and the vital fat-soluble activators, such as vitamins A and D, found exclusively in animal foods.

The Foundation supports a number of movements that contribute to this objective including accurate nutrition instruction, organic and biodynamic farming, pasture feeding of livestock, community-supported farms, honest and informative labeling, prepared parenting and nurturing therapies.

The board and membership of the Weston A. Price Foundation stand united in the belief that modern technology should be harnessed as a servant to the wise and nurturing traditions of our ancestors rather than used as a force destructive to the environment and human health; and that science and knowledge can validate those traditions.

The Foundation's quarterly journal, *Wise Traditions in Food, Farming, and the Healing Arts*, is dedicated to exploring the scientific validation of dietary, agricultural and medical traditions throughout the world. It features illuminating and thought-provoking articles on current scientific research, human diets, non-toxic agriculture, and holistic therapies. The journal also serves as a reference for sources of foods that have been conscientiously grown and processed.

Members of the Weston A. Price Foundation have created a network of 225 local chapters throughout the U.S., Canada, Australia, New Zealand, Europe and now Moscow to help find locally grown meat, eggs, dairy products and produce; and work towards the return of nutrient-dense foods to American tables through educational and activist activities.

The Foundation is member-driven and does not receive funding from any industry source.

The Foundation invites you to visit its informative and educational website at www.westonaprice.org.

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SUMMARY OF FINDINGS

- Major health issues are diet related and the solution to illness can be found in nutrition;
- The real potential from improved diet is preventative in that it may defer or modify the development of a disease state;
- The caloric proportions of proteins, fats and carbohydrates advocated by USDA's Food Pyramid and Dietary Guidelines are alarmingly similar to the USDA guidelines for fattening cattle and other livestock;
- There is no conclusive evidence from epidemiologic studies that dietary fat intake promotes the development of obesity independently of total energy intake;
- Many researchers now recognize that one of the most important factor in preventing weight gain involves the total amount of calories consumed; when a significant portion of these calories come from healthy fats, the body experiences satiety and overall caloric intake is reduced;
- Americans spend approximately 90 percent of their food dollars on processed foods - foods that contain high levels of refined sugars, high fructose corn syrup, refined polyunsaturated oils and *trans* fatty acids as well as highly processed, refined proteins. The reduction in nutrients in these foods requires that we eat more to satisfy the body's nutritional requirements;
- All fats and oils, whether of vegetable or animal origin, are some combination of saturated fatty acids, monounsaturated fatty acids and polyunsaturated fats;
- Commercial, refined vegetable oils (polyunsaturated oils) contain free radicals and dangerous breakdown products that can cause heart disease, cancer, inflammation and aging, as well as increased obesity;
- Modern diets can contain as much as 30% of calories as polyunsaturated oils, but scientific research indicates that this amount is far too high for humans;
- Recent research has revealed that too much omega-6 essential fatty acids (EFA) in the diet from excess polyunsaturated oils in processed foods creates an imbalance that can interfere with production of prostaglandins, leading to increased tendency to form blood clots, inflammation, high blood pressure, irritation of the digestive tract, depressed immune function, sterility, cell proliferation, cancer and weight gain;
- Modern agricultural and industrial practices have reduced the amount of beneficial omega-3 EFA in commercially available vegetables, eggs, fish and meat. Americans must increase the level of consumption of omega-3 essential fatty acids from fish and flax seed sources;

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- *Trans* fatty acids from modern partially hydrogenated vegetable oils are new to the human physiology and by the early 1970s a number of researchers had expressed concern about their presence in the American diet, noting that their increasing use had paralleled the increase in both heart disease and cancer and upsetting cell membranes;

- Most of the *trans* fatty acids in the current American diet come not from margarine but from shortening used in fried and fabricated, processed foods;

- American shortening consumption of 10 grams per person per day held steady until the 1960's, although the content of that shortening had changed from mostly lard, tallow and coconut oil—all natural fats—to partially hydrogenated soybean oil. Then shortening consumption shot up and by 1993 had tripled to over 30 grams per person per day;

- Approximately 70 percent of all the vegetable oils used in processed foods such as crackers, cookies, pastries, cakes, and fried foods are partially hydrogenated and *therefore contain high levels of trans fats*;

- *Trans* fatty acids lower HDL cholesterol, increase LDL and increase the heart disease marker Lipoprotein [a] (Lp[a]) while saturated fats lower Lp[a] - *trans* fatty acids raise blood sugar levels and contribute to diabetes;

- The scientific evidence, honestly evaluated, does not support the assertion that "artery-clogging" saturated fats cause heart disease;

- Animal fats are stable, do not easily develop free radicals, and contain nutrients that are vital for good health;

- Children, in particular, require high levels of quality animal fats to achieve optimal physical and neurological development;

- Cholesterol is not the cause of heart disease but rather a potent antioxidant weapon against free radicals in the blood, and a repair substance that helps heal arterial damage, although the arterial plaques themselves contain very little cholesterol;

- Damaged or oxidized cholesterol seems to promote both injury to the arterial cells as well as a pathological buildup of plaque in the arteries and is found in powdered eggs, in powdered milk (added to reduced-fat milks to give them body) and in meats and fats that have been heated to high temperatures in frying and other high-temperature processes;

- Babies and children need cholesterol-rich foods throughout their growing years to ensure proper development of the brain and nervous system;

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- High serum cholesterol levels often indicate that the body needs cholesterol to protect itself from high levels of altered, free-radical-containing fats;
- High levels of carbohydrate in a diet do not provide the satiety that natural fats do, and the result is that there is a tendency to overeat carbohydrates;
- Only during the last century has the human diet included a high percentage of refined carbohydrates;
- Refined carbohydrates are inimical to life because they are devoid of bodybuilding elements;
- The refining process strips grains, vegetables and fruits of both their vitamin and mineral components. Refined carbohydrates have been called "empty" calories. "Negative" calories is a more appropriate term because consumption of refined calories depletes the body's precious reserves;
- A diet high in refined carbohydrates stimulates an abnormal pancreatic insulin response in order to moderate blood sugar levels;
- As the consumption of sugar has increased, so have all the "civilized" diseases;
- Constant high intake of simple dietary sugar over-stimulates or "burns out" normal, healthy pancreas and adrenal function;
- Until the 1970s most of the sugar we ate came from sugar beets or sugar cane, called sucrose. During the 1970s, sugar from corn - corn syrup, fructose, dextrose, dextrine, and/or high fructose corn syrup - began to gain popularity as a sweetener;
- In the past, fructose was considered to be beneficial to diabetics because it is absorbed only 40 percent as quickly as glucose and causes only a modest rise in blood sugar; however, research on other hormonal factors suggests that fructose actually promotes disease more than glucose;
- Glucose is metabolized in every cell in the body but all fructose in metabolized in the liver; the livers of test animals fed large amounts of fructose develop fatty deposits and cirrhosis, similar to the livers of alcoholics;
- Research indicates that free fructose interferes with the heart's use of key minerals like magnesium, copper and chromium; among other consequences, it has been implicated in elevated blood cholesterol levels and blood clotting;
- The more carbohydrate that is eaten, the more fat the liver and adipose tissue make from any excess carbohydrate;

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- Just as animal fats are our only sources of natural vitamins A and D and other bodybuilding factors, so also animal protein is our only source of complete protein;
- The two best sources of protein in the vegetable kingdom are legumes and cereal grains, but all plant foods are low in the amino acids tryptophan, cystine and threonine. Legumes, such as beans, peanuts and cashews are high in the amino acid lysine but low in methionine. Cereal grains have the opposite profile;
- Scientific evidence, honestly evaluated, argues against relying too heavily on grains and legumes as sources of protein or for severely reducing animal products in the diet;
- Inadequate protein intake leads to loss of myocardial muscle and may therefore contribute to coronary heart disease;
- Usable vitamin B_{12} occurs only in animal products;
- Isolated protein powders made from soy, whey, casein and egg whites are currently popular as basic ingredients in diet beverages and many so-called health food products. These protein isolates are usually obtained by a high-temperature process that over-denatures the proteins to such an extent that they become virtually useless while increasing nitrates and other carcinogens and decreasing vitamin A levels;
- *Animal protein foods—fish, meat, eggs and milk—always come with fat and this is* how we should eat them. Animal fat supplies vitamins A and D needed for the assimilation of protein. Consumption of low fat milk products, egg whites and lean meat can lead to serious deficiencies of these vital fat-soluble nutrients;
- Over the long term, low-fat diets have been shown to be disadvantageous for preventing the diseases they have been recommended for - most people are at risk for lowered intakes of the important fat-soluble vitamins and other fat-soluble nutrients when they consume low-fat diets for any length of time.
- While not a macronutrient, excitotoxins such as monosodium glutamate (MSG) and aspartame play a significant role in the processing of foods consumed by Americans and our resultant levels of obesity.
- Excitotoxins are present in almost all processed foods.
- Excitotoxins have been identified in playing a critical role in the development of a number of neurological disorders.
- Of particular concern are the toxic effects of excitotoxins on the developing brain.

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INTRODUCTION

Obesity is clearly on the rise in America. Over 65 percent of Americans are considered to be overweight with 25 percent clinically obese. According to the Surgeon General's 2001 report on obesity, 13 percent of children and adolescents were overweight in 1999.[1] African-American and Mexican-American children are twice as likely as non-Hispanic white children to have a body mass index of more than 25, the definition of overweight. During the last three decades, the number of overweight young Americans has tripled, with no sign the trend is abating.

The question we are asking is, "To what degree are the foods we eat and the kind of foods we eat contributing to this epidemic of obesity?" The Weston A. Foundation would say, "We are what we eat and what we can digest." Food and the types of foods consumed by Americans today play a significant role in creating this situation. We will present evidence why this is so and what we can do to reverse this trend.

A 1971 USDA study on nutrition titled, "An Evaluation of Research in the Untied States on Human Nutrition"[2] reported:

- Major health issues are diet related;
- The solution to illness can be found in nutrition
- The real potential from improved diet is preventative in that it may defer or modify the development of a disease state
- Better health, a longer lifespan and greater satisfaction from work, family and leisure time are some of the benefits from improved nutrition

Interestingly, this very important study was never released to the public by the Nixon Administration.

In 1988, "The Surgeon General's Report on Nutrition and Health" addressed the overwhelming evidence of the connection between diet and chronic disease.[3] In his report, then Surgeon General C. Everett Koop stated, "For the two out of three adult Americans who do not smoke and do not drink excessively, one personal choice seems to influence long-term health prospects more than any other: what we eat... The weight of this evidence and the magnitude of the problem at hand indicate that it is now time to take action." C. Everett Koop said this fifteen years ago.

Fifty years ago, grocery stores stocked about 200 items. Seventy percent of those were grown, produced or processed within a 100-mile radius of the store. Today, the average supermarket carries 50,000 food items or more;[4] most of these foods are highly processed and refined, most of which are transported thousands of miles to their final destination. Americans spend over 90 percent of their food dollars on these processed foods[5] - foods that contain high levels of refined sugars, high fructose corn syrup, refined polyunsaturated oils and *trans* fatty acids as well as highly processed, refined

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proteins. The reduction in nutrients in these foods requires that we eat more to satisfy the body's nutritional requirements.

The current Dietary Guidelines and Food Pyramid recommend a diet based largely on carbohydrates in the form of grains such as bread, crackers, pasta, rice, etc., with smaller amounts of fruits and vegetables; with small amounts of lean meat, legumes and low-fat dairy as protein sources and sparing use of fats and oils. The current Guidelines strongly favor a low-fat, high-carbohydrate, high glycemic index/load diet. The caloric proportions of protein to fat to carbohydrates are 10-25% protein, up to 30% fat and 45-65% carbohydrates.

In fact, the proportions of proteins, fats and carbohydrates advocated by the USDA Food Pyramid and Dietary Guidelines are alarmingly similar to the USDA guidelines for *fattening cattle and other livestock, which are approximately 10% protein, 29% fats and* 61% carbohydrates.[6]

The Guidelines were first developed during the late 1970s in response to the growing incidence of coronary heart disease (CHD) in this country and research that purportedly showed that saturated fat and cholesterol were the culprits in the escalation of CHD. The lipid theory of heart disease became the prevailing mantra of the health and medical community.

Dr. Ancel Keys first proposed the lipid theory of heart disease in the 1950's. The theory basically states that there is a direct relationship between the amount of saturated fat and cholesterol in the diet and the incidence of coronary heart disease. The health community assures us that the lipid hypothesis is backed by incontrovertible scientific proof. Most people would be surprised to learn that there is, in fact, very little evidence to support the contention that a diet low in cholesterol and saturated fat actually reduces death from heart disease or in any way increases one's life span.[7]

What actually happened, though, can be likened to the stock market.[8] Stock markets often give rise to a boom-bust process, or bubble. Bubbles go not grow out of the blue; they have a basis in reality – but a reality distorted by a misconception (lipid theory of heart disease). Under normal conditions misconceptions are self-correcting. The stock markets will move toward some form of equilibrium. Upon occasion, a misconception is reinforced by a trend prevailing in reality (escalating incidence of heart disease), and that is when the boom-bust process begins. Eventually, the gap between reality and its false interpretation becomes unsustainable and the bubble bursts (currently heading towards a burst of the lipid theory).

During the self-reinforcing phase, participants are under the spell of the prevailing bias (lipid theory and low-fat diets). Clinical events and research seem to confirm their beliefs, strengthening their misconceptions. This widens the gap and sets the stage for a moment of truth and eventual reversal. When the reversal comes, it can have major consequences. However, the momentum of the bubble can be reversed at any time and adverse effects can be reduced or avoided altogether. Such noted bubbles that burst

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with consequences include the extremes of the information-technology boom – dot.com's – that ended in 2000.

The lipid theory of heart disease is the element of reality that is being distorted. As mentioned previously significant current research abounds refuting this theory.[9] The proposition that low fat diets and the Food Pyramid are the way to better health is the misconception. Growing incidence of obesity as well the fact that heart disease that has not decreased since the launch of the misconceptions are bursting the bubble.

Public health officials have recommended "low-fat" diets for most modern diseases, particularly for treatment of obesity.[10] However, not all researchers accept the theory that fat intake causes obesity. In fact, there is no conclusive evidence from epidemiologic studies that dietary fat intake promotes the development of obesity *independently of total energy intake.*[11]

Many researchers now recognize that one of the most important factors in preventing weight gain involves the total amount of calories consumed, a view that matches the understanding of clinicians half a century ago. When a significant portion of these calories comes from healthy fats, the body experiences satiety and overall caloric intake is reduced. Nevertheless the common recommendation continues to be a "low-fat" diet for treating obesity in spite of research reporting better results with the lower-carbohydrate, higher fat diet.[12,13,14,15,16,17,18,19,20]

But, what are healthy fats? Beneficial fats include unrefined saturated and monounsaturated fats including butter and other animal fats, palm oil and coconut oil, olive oil and peanut oil. We would also include flaxseed oil for its high omega-3 essential fatty acid content. We do not include refined polyunsaturated vegetable oils.

Pediatrician clinicians have noted a number of years ago that children put onto a low fat and low cholesterol diets failed to grow properly.[21] When researchers prominently associated with the American Heart Association fed children lower fat diets and measured some of the health markers they consider important predictors of heart disease, they learned that these lower fat diets were causing the very problems they wanted to prevent. The children whose genes would normally have been producing the desirable form of low-density lipoproteins - light fluffy LDL - started to make the dangerous form of LDL - small dense LDL's.[22]

We are at a place when the bubble that has led to the current levels of obesity can be reversed. Let us see now how that can take place.

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FATS

The current Guidelines stipulate that total fats should make up 30 percent or less of total calories, with saturated fats contributing to not more than 10 percent of total calories. The Guidelines are based on the assumption that we should reduce our intake of fats, particularly saturated fats from animal sources. Fats from animal sources also contain cholesterol, presented as the twin villain of the civilized diet.

However, dietary fats play many vital roles in the body chemistry. Fats provide a concentrated source of energy in the diet; they also provide the building blocks for cell membranes and a variety of hormones and hormone-like substances. Fats as part of a meal slow down absorption so that we can go longer without feeling hungry. In addition, they act as carriers for important fat-soluble vitamins A, D, E and K. Dietary fats are needed for the conversion of carotene to vitamin A, for mineral absorption and for a host of other processes.

By analyzing menus from early 20th century cookbooks, we can estimate that the fat content of the diets at that time was about 35-40 percent of energy as fat.[23] Fats contain about twice as many calories per gram as protein or carbohydrate foods. In a diet of 2500 calories, 35 percent of calories as fat translates to 97 grams of fat (slightly less than 1/2 cup) per day, as added fat or distributed in the foods.

Fatty Acid Classifications by Saturation

Fatty acids are classified in the following way:

Saturated: A fatty acid is saturated when all available carbon bonds are occupied by a hydrogen atom. They are highly stable, because all the carbon-atom linkages are filled—or saturated—with hydrogen. This means that they do not normally go rancid, even when heated for cooking purposes. They are straight in form and hence pack together easily, so that they form a solid or semisolid fat at room temperature. Your body makes saturated fatty acids from carbohydrates and they are found in animal fats and tropical oils.

Monounsaturated: Monounsaturated fatty acids have one double bond in the form of two carbon atoms double-bonded to each other and, therefore, lack two hydrogen atoms. Your body makes monounsaturated fatty acids from saturated fatty acids and uses them in a number of ways. Monounsaturated fats have a kink or bend at the position of the double bond so that they do not pack together as easily as saturated fats and, therefore, tend to be liquid at room temperature. Like saturated fats, they are relatively stable. They do not go rancid easily and hence can be used in cooking. The monounsaturated fatty acid most commonly found in our food is oleic acid, the main component of olive oil as well as the oils from almonds, pecans, cashews, peanuts and avocados.

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Polyunsaturated: Polyunsaturated fatty acids have two or more pairs of double bonds and, therefore, lack four or more hydrogen atoms. The two polyunsaturated fatty acids found most frequently in our foods are double unsaturated linoleic acid, with two double bonds—also called omega-6; and triple unsaturated linolenic acid, with three double bonds—also called omega-3. (The omega number indicates the position of the first double bond.) Your body cannot make these fatty acids and hence they are called "essential." We must obtain our essential fatty acids or EFA's from the foods we eat. The polyunsaturated fatty acids have kinks or turns at the position of the double bond and hence do not pack together easily. They are liquid, even when refrigerated. The unpaired electrons at the double bonds makes these oils highly reactive. They go rancid easily, particularly omega-3 linolenic acid, and must be treated with care. Polyunsaturated oils should never be heated or used in cooking. In nature, the polyunsaturated fatty acids are usually found in the *cis* form, which means that both hydrogen atoms at the double bond are on the same side.

All fats and oils, whether of vegetable or animal origin, are some combination of saturated fatty acids, monounsaturated fatty acids and polyunsaturated omega 6 linoleic acid and omega 3 linolenic acid. In general, animal fats such as butter, lard and tallow contain about 40-60% saturated fat and are solid at room temperature. Vegetable oils from northern climates contain a preponderance of polyunsaturated fatty acids and are liquid at room temperature. But vegetable oils from the tropics are highly saturated. Coconut oil, for example, is 92% saturated. These fats are liquid in the tropics but hard as butter in northern climes. Vegetable oils are more saturated in hot climates because the increased saturation helps maintain stiffness in plant leaves. Olive oil with its preponderance of monounsaturated oleic acid is the product of a temperate climate. It is liquid at warm temperatures but hardens when refrigerated.

Classification of Fatty Acids by Length

Researchers classify fatty acids not only according to their degree of saturation but also by their length.

Short-chain fatty acids have four to six carbon atoms. These fats are always saturated. Four-carbon butyric acid is found mostly in butterfat from cows, and six-carbon capric acid is found mostly in butterfat from goats. These fatty acids have antimicrobial properties—that is, they protect us from viruses, yeasts and pathogenic bacteria in the gut. They do not need to be acted on by the bile salts but are directly absorbed for quick energy. For this reason, they are less likely to cause weight gain than olive oil or commercial vegetable oils.[24] Short-chain fatty acids also contribute to the health of the immune system.[25]

Medium-chain fatty acids have eight to twelve carbon atoms and are found mostly in butterfat and the tropical oils. Like the short-chain fatty acids, these fats have antimicrobial properties; are absorbed directly for quick energy; and contribute to the health of the immune system.

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Long-chain fatty acids have from 14 to 18 carbon atoms and can be either saturated, monounsaturated or polyunsaturated. Stearic acid is an 18-carbon saturated fatty acid found chiefly in beef and mutton tallows. Oleic acid is an 18-carbon monounsaturated fat which is the chief component of olive oil. Another monounsaturated fatty acid is the 16-carbon palmitoleic acid, which has strong antimicrobial properties. It is found almost exclusively in animal fats. The two essential fatty acids are also long chain, each 18 carbons in length. Another important long-chain fatty acid is gamma-linolenic acid (GLA), which has 18 carbons and three double bonds. It is found in evening primrose, borage and black currant oils. Your body makes GLA out of omega-6 linoleic acid and uses it in the production of substances called prostaglandins, localized tissue hormones that regulate many processes at the cellular level.

Very-long-chain fatty acids have 20 to 24 carbon atoms. They tend to be highly unsaturated, with four, five or six double bonds. Some people can make these fatty acids from EFA's, but others, particularly those whose ancestors ate a lot of fish, lack enzymes to produce them. These "obligate carnivores" must obtain them from animal foods such as organ meats, egg yolks, butter and fish oils. The most important very-long-chain fatty acids are dihomo-gamma-linolenic acid (DGLA) with 20 carbons and three double bonds; arachidonic acid (AA) with 20 carbons and four double bonds; eicosapentaenoic acid (EPA) with 20 carbons and five double bonds; and docosahexaenoic acid (DHA) with 22 carbons and six double bonds. All of these except DHA are used in the production of prostaglandins. In addition, AA and DHA play important roles in the function of the nervous system.[26]

See Appendix I for a detailed description of the composition of various commonly-used fats and oils.

During the early 20th century, most of the fatty acids in the diet were either saturated or monounsaturated, primarily from butter, lard, tallows, coconut oil and small amounts of olive oil. Today, most of the fats in our diet are polyunsaturated, primarily from vegetable oils derived from soy, corn, safflower, sunflower, cottonseed and rape seed (canola – primarily monounsaturated) as depicted in Table I.

Table I: Changes in U.S. Dietary Fats During the 20th Century (grams/capita/day)

Year	Total Fat	Saturated Fat	Unsaturated Fat
1909-19	120	50	60
1990-99	159	51	100

Adopted from Cordain, L, Eades, MR, "Hyperinsulinemic Diseases of Civilization: More Than Just Syndrome X," *Comparative Biochemistry and Physiology*, Part A, 136 (2003): 95-112, p. 100.

Table I indicates that total daily per capita fat consumption increased by about 33 percent between 1909 and 1999, saturated fat consumption remained nearly constant. A marked 67 percent rise in intake of unsaturated oils, mostly in the form of vegetable oils, accounted for almost all of the increased dietary fat during this time.

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Fatty acids found in foods that are natural to the human body include:[27]

Saturated Fats

- Palmitic acid **
- Stearic acid **
- Myristic acid **
- Lauric acid ***

Monounsaturated Fats

- Palmitoleic acid **
- Oleic acid **

Polyunsaturated Fats

- Linoleic (omega 6) essential fatty acid *
- Alpha linolenic (omega 3) essential fatty acid *
- Gamma linolenic acid **
- Arachidonic acid **
- Eicosapentaenoic acid **
- Docosahexaenoic acid **

* these fatty acids are used and needed by the body, but the body does not make them; they are called essential fatty acids (EFA)

** these fatty acids are used and needed by the body and the body makes them

*** this fatty acid is made by certain parts of the body such as the lactating mammary gland, but must come from the diet so it is a conditionally essential fatty acid

Fatty acids found in foods that are *not* natural to the human body include almost all of the *trans* fatty acids, commonly found in processed foods.

Let us take a look at how the fatty acid profile of the human body compares to common dietary animal and vegetable/nut fats in Table II.

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Table II: Average Fatty Acid Profiles of Some Common Fats and Oils

	Saturated Fats (%)	Monounsaturated Fats (%)	Polyunsaturated Fats (%) Total	Omega 3	Omega 6
Human	**43**	**47**	**10**		
Human Milk Fat	48	33	16		
Animal					
Beef Tallow	56	39	5	1	2
Butter*	66 (14* + 52)	30	4	<1	3
Lard	41	47	12	<1	10
Chicken Fat	38	42	20	1	19
Salmon	17-28	37-49	23-45		
Vegetable/ Nut					
Canola (unrefined)	6	56-64	31-38	10	19-26
Coconut*	91 (63* + 28)	6	3		2
Corn	14	28	58	1	57
Flax	9	17	74	60	14
Olive	17	71	11	<1	10
Peanut	17	46	37		31
Palm	50	40	10		10
Palm Kernal *	83 (56* + 27)	18	1		1
Safflower - high linoleic variety	8	13	79		78
Safflower – high oleic variety	7	80	12		12
Sesame	15	41	44		43
Soy (unrefined)	15	23	62	8	53

* Coconut and Palm Kernal Oil are high in short and medium chain fatty acids (63% for Coconut Oil and 56% in Palm Kernal Oil) while butter generally has about 14% of its saturated fat as short and medium chain fatty acids. Caloric content and metabolism of short and medium chain saturated fats is closer to that of carbohydrates. Long chained saturated fatty acids produce more calories per equivalent weight than short and medium chained fatty acids.

Source: Human Fat: Bettelheim FA, Brown WH, March J, *Introduction to General Organic and Biochemistry,* sixth edition, (Brooks/Cole, 2001), p. 474. Animal and vegetable/nut fatty acid profiles: Enig, Mary, *Know Your Fats: The Complete Primer for Understanding the Nutrition of Fats, Oils and Cholesterol* (Silver Spring, MD, Bethesda Press, 2000), pp. 113-152 and Table D-1, p. 294.

Forty-three percent of the fat produced and stored by the human body is saturated. This fatty acid profile is quite similar to that of the other animal fats, especially lard, which is produced from pigs. Vegetable oil fat profiles are quite different than the human and animal fatty acid profile, much higher in polyunsaturated oils, especially omega 6 essential fatty acid.

Tissues of temperate or northern plants, fish, and other cold-blooded animals typically produce highly unsaturated fats, while warm-blooded animals, including human beings, and tropical plants (coconut and palm oil) produce more saturated fats. This difference

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is caused by the melting point of the various fats. Animals and plants inhabiting colder climates or having low body temperatures produce more unsaturated oils because these fats are sufficiently fluid at low temperatures; saturated fats would be too stiff.

In contrast, unsaturated fats would be too fluid for warm-blooded humans and animals and tropical plants to create the needed fatty pads, fat storage deposits, and strong and workable cell membranes. Unsaturated fats are prone to produce carcinogenic peroxides in warm oxygen-rich environments, such as in the human body. Saturated fats are combined with the unsaturated fats in nature to provide necessary antioxidants and protection for the essential fatty acids.[28]

It should be noted that animals store fat mainly as a reservoir of energy for use between meals or when food is scarce. The human body runs on its saturated fat stores between meals and during food scarcity, including fasting. The resting muscles, heart and liver together consume most of the energy used by the body. Their tissues prefer saturated fat for fuel.[29]

Saturated Fats

The human body makes its own saturated fats because they are essential to our health and well-being. The fatty pads that that protect bony surfaces (sitting bones, palms and soles of the feet) and fat deposits that cushion internal organs are largely made up of saturated fats. Saturated fats are used in the cell membrane to resist the penetration of parasites, viruses and bacteria. In addition, saturated fats play an important role in the nervous system and the brain. The grey matter of the nervous system is composed largely of sphingomyelin, a compound that incorporates one saturated fatty acid, most commonly palmitic or stearic acids.[30] The white matter of the brain is composed largely of phosopholipids, again incorporating palmitic or stearic acids. About one-third of the brain is composed of saturated fats.

The Foundation recommends that the USDA discontinue its unscientific opposition to animal fats. Animal fats are stable, do not easily develop free radicals, and contain nutrients that are vital for good health. Children, in particular, require high levels of quality animal fats to achieve optimal physical and neurological development. In addition, animal fats have been highly valued in all traditional cultures.[31]

During the sixty-year period from 1910 to 1970, the proportion of traditional animal fat in the American diet declined from 83% to 62%, and butter consumption plummeted from eighteen pounds per person per year to four. During the past eighty years, dietary cholesterol intake has increased only 1%. During the same period the percentage of dietary vegetable oils in the form of margarine, shortening and refined oils increased about 400% while the consumption of sugar and processed foods increased about 60%.[32]

Foods containing *trans* fat sell because the American public is afraid of the alternative—saturated fats found in tallow, lard, butter, palm and coconut oil, fats traditionally used

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for frying and baking. Yet the scientific literature delineates a number of vital roles for dietary saturated fats:

- Saturated fatty acids constitute at least 50% of most of the cell membranes. They are what furnish our cells necessary stiffness and integrity.
- They play a vital role in the health of our bones. For calcium to be effectively incorporated into the skeletal structure, at least 50% of the dietary fats should be saturated.[33]
- They lower Lp(a), a substance in the blood that indicates proneness to heart disease.[34]
- They protect the liver from alcohol and other toxins, such as Tylenol.[35]
- They enhance the immune system.[36]
- They are needed for the proper utilization of essential fatty acids. Elongated omega-3 fatty acids are better retained in the tissues when the diet is rich in saturated fats.[37]
- Stearic acid and palmitic acid are the preferred foods for the heart, which is why the fat around the heart muscle is highly saturated.[38] The heart draws on this reserve of fat in times of stress.
- Short- and medium-chain saturated fatty acids have important antimicrobial properties. They protect us against harmful microorganisms in the digestive tract.

The scientific evidence, honestly evaluated, does not support the assertion that "artery-clogging" saturated fats cause heart disease.[39] Actually, evaluation of the fat in artery clogs reveals that only about 26% is saturated. The rest is unsaturated, of which more than half is polyunsaturated.[40] Although consumption of saturated fatty acids in an institutional setting has been shown to temporarily raise serum cholesterol levels, there is no evidence that consumption of saturated fats from animal sources and the tropical oils contributes to heart disease.[41]

See Appendix II "Saturated Fats are Beneficial, Not Harmful" for a more complete list of the benefits of saturated fats.

Cholesterol

Our blood vessels can become damaged in a number of ways—through irritations caused by free radicals or viruses, or because they are structurally weak—and when this happens, the body's natural healing substance steps in to repair the damage. That substance is cholesterol. Cholesterol is a high-molecular-weight alcohol that is manufactured in the liver and in most human cells. Like saturated fats, the cholesterol we make and consume plays many vital roles.

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Cholesterol is not the cause of heart disease but rather a potent antioxidant weapon against free radicals in the blood, and a repair substance that helps heal arterial damage, although the arterial plaques themselves contain very little cholesterol. The cholesterol in your diet (dietary cholesterol) has very little effect on the cholesterol in your blood (serum cholesterol). You could completely eliminate all cholesterol from your diet and your liver would just produce more of it, because your body needs cholesterol. On the other hand, eating more cholesterol would cause your liver to reduce production to maintain consistent levels.

More than 60 percent of all heart attacks occur in people with normal cholesterol levels. The majority of people with high cholesterol never suffer heart attacks and half of all heart attack victims have none of the standard risk factors, i.e., obesity, high cholesterol, smoking or genetics.

Like fats, however, cholesterol may be damaged by exposure to heat and oxygen. This damaged or oxidized cholesterol seems to promote both injury to the arterial cells (endothelium – the layer of tissue that lines all of our arteries and veins) as well as a pathological buildup of plaque in the arteries.[42] Damaged cholesterol is found in powdered eggs, in powdered milk (added to reduced-fat milks to give them body) and in meats and fats that have been heated to high temperatures in frying and other high-temperature processes.

See Appendix III for a more complete list of the benefits of cholesterol.

Breast milk is especially rich in cholesterol and contains a special enzyme that helps the baby utilize this nutrient. Babies and children need cholesterol-rich foods throughout their growing years to ensure proper development of the brain and nervous system.

High serum cholesterol levels often indicate that the body needs cholesterol to protect itself from high levels of altered, free-radical-containing fats. Just as a large police force is needed in a locality where crime occurs frequently, so cholesterol is needed in a poorly nourished body to protect the individual from a tendency to heart disease and cancer. Dietary cholesterol plays an important role in maintaining the health of the intestinal wall,[43] which is why low-cholesterol vegetarian diets can lead to leaky gut syndrome and other intestinal disorders.[44]

Poor thyroid function (hypothyroidism) will often result in high cholesterol levels. When thyroid function is poor, usually due to a diet high in sugar and low in usable iodine, fat-soluble vitamins and other nutrients, the body floods the blood with cholesterol as an adaptive and protective mechanism, providing a superabundance of materials needed to heal tissues and produce protective steroids. Hypothyroid individuals are particularly susceptible to infections, heart disease and cancer.[45]

Framingham Heart Study is often cited as proof of that cholesterol and saturated fats cause heart disease. This study began in 1948 and involved some 6,000 people from

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the town of Framingham, Massachusetts. Two groups were compared at five-year intervals—those who consumed little cholesterol and saturated fat and those who consumed large amounts. After 40 years, the director of this study, Dr. William Castelli, had to admit: **"In Framingham, Mass, the more saturated fat one ate, the more cholesterol one ate, the more calories one ate, the lower the person's serum cholesterol. . . we found that the people who ate the most cholesterol, ate the most saturated fat, ate the most calories, weighed the least and were the most physically active."**[46] The study did show that those who weighed more and had abnormally high blood cholesterol levels were slightly more at risk for future heart disease; but weight gain and cholesterol levels had an inverse correlation with fat and cholesterol intake in the diet.[47]

Animal foods containing saturated fat and cholesterol provide vital nutrients necessary for growth, energy and protection from degenerative disease. Like sex, animal fats are necessary for reproduction. Humans are drawn to both by powerful instincts. "Whatever is the cause of heart disease," said the eminent biochemist Michael Gurr, "it is not primarily the consumption of saturated fats.[48]

Polyunsaturated Fats and Vegetable Oils

Polyunsaturated fatty acids occur in small amounts in all foods. Polyunsaturated oils contain large amounts of polyunsaturated fatty acids. Commercial polyunsaturated oils made from corn, soy, safflower and sunflower seeds are new to human diets. The use of these industrially processed oils is four fold higher today than it is was in 1900.[49]

Since the early part of the 20th century, when the Department of Agriculture (USDA) had begun to keep track of food "disappearance" data—the amount of various foods going into the food supply—a number of researchers had noticed a change in the kind of fats Americans were eating. Butter consumption was declining while the use of vegetable oils, especially oils that had been hardened to resemble butter by a process called hydrogenation, was increasing. By 1950 butter consumption had dropped from eighteen pounds per person per year to just over ten. Margarine filled in the gap, rising from about two pounds per person at the turn of the 20th century to about eight. Consumption of vegetable shortening—used in crackers and baked goods—remained relatively steady at about twelve pounds per person per year but vegetable oil consumption had more than tripled—from just under three pounds per person per year to more than ten.[50]

Polyunsaturated fatty acids are very fragile. When exposed to heat and oxygen, as during commercial processing, they form free radicals and other harmful breakdown products that damage the body in many ways.[51] Modern processing destroys the vitamins and antioxidants in vegetable oils, but the pesticides used on the seeds are retained.[52] Seed oils are highly sprayed. Because polyunsaturates are highly subject to rancidity, they increase the body's need for vitamin E and other antioxidants.

See Appendix IV for modern methods of processing fats.

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Researchers have found that commercial vegetable oils (polyunsaturated oils) contain free radicals and dangerous breakdown products that can cause heart disease, cancer, inflammation and aging, as well as increased obesity. In the young, diets based on vegetable oils depress learning and cause growth problems. Furthermore, these oils are often partially hydrogenated and contain dangerous *trans* fatty acids.[53]

Research has determined that:

- Polyunsaturated oils cause the formation of black-brown ceroid pigment deposits, a sign of aging.[54]
- In animal studies, polyunsaturated oil shortens life span and increases the possibility of atherosclerosis, cancer and other disease.[55]
- Polyunsaturated oils increase the levels of uric acid in the body, a sign of the destruction of protein. An elevated level of uric acid is a heart disease risk factor.[56]
- In animals, consumption of excessive polyunsaturates causes cirrhosis of the liver, similar to that caused by excessive alcohol.[57]
- Many studies have shown that polyunsaturated oils cause cancer.[58]
- Polyunsaturated oils are particularly damaging to the reproductive organs and the lungs.[59]
- Polyunsaturated oils depress learning ability, especially under conditions of stress.[60]
- Polyunsaturated oils given to young animals impair growth.[61]
- When heated, as in cooking, polyunsaturated oils bond to each other forming polymers, leading to digestive problems (varnish and shellac are polymers).[62]

Excess use of commercial vegetable oils interferes with the production of prostaglandins leading to an array of complaints ranging from autoimmune disease to PMS. Disruption of prostaglandin production leads to an increased tendency to form blood clots, and hence myocardial infarction.[63]

See Appendix V "Adverse Effects of Excess Polyunsaturated Oils" for detailed list of the health impact of these oils.

Trans Fatty Acids

Trans fatty acids are found in very minor amounts, usually less than 2 percent but sometimes up to 5 percent of the total fat, in all naturally occurring ruminant fats (antelope, buffalo, cow, deer, goat and sheep). They are found in major amounts, as

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much as 50 to 60 percent or more of the total fat, in partially hydrogenated vegetable oils.[64]

Actually the kinds of *trans* fatty acids found in ruminant fats differ considerably from those found in partially hydrogenated vegetable oils because of the average placement of the *trans* double bonds. This form of *trans* fats found in ruminant animals is a precursor to conjugated linoleic acid (CLA), which is reported to be anticarcinogenic.[65]

The major *trans* fatty acids found in partially hydrogenated vegetable oils have the majority of their double bonds in sites along the 18 carbon fatty acid that are found to raise health problems. A French chemist named Sabatier first discovered the technology by which liquid vegetable oils could be hardened to make margarine. He found that a nickel catalyst would cause the hydrogenation—the addition of hydrogen to unsaturated bonds to make them saturated—of ethylene gas to ethane. Subsequently the British chemist Norman developed the first application of hydrogenation to food oils and took out a patent. In 1909, Procter & Gamble acquired the US rights to the British patent that made liquid vegetable oils solid at room temperature. The process was used on both cottonseed oil and lard to give "better physical properties"—to create shortenings that did not melt as easily on hot days.

The hydrogenation process transforms unsaturated oils into straight "packable" molecules, by rearranging the hydrogen atoms at the double bonds. In nature, most double bonds occur in the *cis* configuration, that is with both hydrogen atoms on the same side of the carbon chain at the point of the double bond. It is the *cis* isomers of fatty acids that have a bend or kink at the double bond, preventing them from packing together easily. Hydrogenation creates *trans* double bonds by moving one hydrogen atom across to the other side of the carbon chain at the point of the double bond. In effect, the two hydrogen atoms then balance each other and the fatty acid straightens, creating a packable "plastic" fat with a much higher melting temperature.

Although *trans* fatty acids are technically unsaturated, they are configured in such a way that the benefits of unsaturation are lost. The presence of several unpaired electrons presented by contiguous hydrogen atoms in their *cis* form allows many vital chemical reactions to occur at the site of the double bond. When one hydrogen atom is moved to the other side of the fatty acid molecule during hydrogenation, the ability of living cells to make reactions at the site is compromised or altogether lost. *Trans* fatty acids are sufficiently similar to natural fats that the body readily incorporates them into the cell membrane; once there their altered chemical structure creates havoc with thousands of necessary chemical reactions—everything from energy provision to prostaglandin production.

After the Second World War, "improvements" made it possible to plasticize highly unsaturated oils from corn and soybeans. New catalysts allowed processors to "selectively hydrogenate" the kinds of fatty acids with three double bonds found in soy and canola oils. Called "partial hydrogenation," the new method allowed processors to replace cottonseed oil with more unsaturated corn and soybean oils in margarines and

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shortenings. This spurred a meteoric rise in soybean production, from virtually nothing in 1900 to 70 million tons in 1970, surpassing corn production. Today soy oil dominates the market and is used in almost eighty percent of all hydrogenated oils.

When people eat fats containing these forms of *trans* fatty acids, the fatty acids are deposited in varying amounts in some of the tissues. *Trans* fats from partially hydrogenated vegetable oils also can have a negative impact on the functioning of organs in the body. *Trans* fatty acids from partially hydrogenated vegetable oils disrupt cellular function, which affects enzyme functionality. These *trans* fats interfere with the necessary conversions of both the omega-6 and omega-3 essential fatty acids (EFA) to their elongated forms and consequently escalate the adverse effects of EFA deficiency (see next section on essential fatty acids).

Most of the *trans* isomers in modern hydrogenated fats are new to the human physiology and by the early 1970's a number of researchers had expressed concern about their presence in the American diet, noting that their increasing use had paralleled the increase in both heart disease and cancer.[66] In fact, as early as 1958 Ancel Keys originally claimed that partially hydrogenated vegetable oils with their *trans* fatty acids were the culprits in heart disease, not saturated fats.[67]

Most of the *trans* fats in the current American diet come not from margarine but from shortening used in fried and processed foods. American shortening consumption of 10 grams per person per day held steady until the 1960's, although the content of that shortening had changed from mostly lard, tallow and coconut oil—all natural fats—to partially hydrogenated soybean oil. Then shortening consumption shot up and by 1993 had tripled to over 30 grams per person per day.[68]

The particular mix of fatty acids in soy oil results in shortenings containing about 40% trans fats, an increase of about 5% over cottonseed oil, and 15% over corn oil. Canola oil, processed from a hybrid form of rape seed, is particularly rich in fatty acids containing three double bonds and the shortening can contain as much as 50% *trans* fats. *Trans* fats of a particularly problematical form are also formed during the deodorization of canola oil, although they are not indicated on labels for the liquid oil.[69]

Approximately 70 percent of all the vegetable oils used in processed foods such as crackers, cookies, pastries, cakes, and fried foods are partially hydrogenated and therefore contain high levels of *trans* fats.[70] The commercial shortenings used in these products have 25-50 percent of the fat as *trans* fats; commercial shortenings made with partially hydrogenated canola oils have the same or even higher levels of *trans* fatty acids. **This means that the fat ingredient in cookies, crackers, donuts, cakes, frostings, etc. is between one-quarter and one half *trans* fatty acids.**[71]

***Trans* fatty acids in the diet, created from partially hydrogenating vegetable oils, have been implicated as causing or exacerbating most of our modern diseases, including heart disease, cancer, diabetes, obesity, immune dysfunction and bone**

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loss. Some adverse effects of consuming *trans* fatty acids reported in humans and animals are the following:

- increases blood insulin levels in humans in response to glucose load, increasing risk for diabetes;
- interfere with the ability of new mothers to nurse successfully and increase the likelihood of developing diabetes (lowers the amount of cream by volume in milk from lactating females in all species studied, including humans, thus lowering the overall quality available to an infant);
- predispose pregnant mothers to low-birth-weight babies;
- causes a dose response decrease in visual acuity in infants who are fed human milk with increasing levels of *trans* fatty acids, which extends to 14 months of age;
- affects immune response by lowering efficiency of B cell response and increasing proliferation of T cells;
- decreases the response of the red blood cell to insulin, thus having a potentially undesirable effect on diabetes;
- causes alterations in adipose cell size, cell number, lipid class, and fatty acid composition;
- contributes to osteoporosis;
- decreases testosterone, causes the production of abnormal sperm and altered gestation;
- causes adverse alterations in the activities of the important enzyme system that metabolizes chemical carcinogens and drugs;
- precipitates childhood asthma;
- interferes with the body's use of omega-3 fatty acids found in fish oils, grains and green vegetables, leading to impaired prostaglandin production;
- increases the incidence of heart disease because *trans* fatty acids lower HDL cholesterol, increase LDL and increase the heart disease marker Lipoprotein [a] (Lp[a]) while saturated fats lower Lp[a];
- raises total serum cholesterol levels 20-30mg%; and

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- causes adverse alterations in physiological properties of biological membranes including measurements of membrane transport and membrane fluidity.

(Table derived from Mary Enig, PhD, *Trans Fatty Acids in the Food Supply: A Comprehensive Report Covering 60 Years of Research*, 2nd Edition, Bethesda Press, 1995 and Mary Enig, *Know Your Fats: The Complete Primer for Understanding the Nutrition of Fats, Oils and Cholesterol*, Bethesda Press, 2000, pp 42-44 and 85-86).

The Foundation is pleased with the recent FDA ruling requiring food labels to incorporate information on *trans* fatty acid content by 2006.[72] However, we wish to make it very clear that *trans* fatty acids are not natural saturated fats and should not be considered as such. Many researchers, health organizations and food companies tend to lump saturated fats and *trans* fatty acids together as the same, particularly for food labeling purposes. This is a grave mistake that has contributed to incorrectly associating beneficial saturated fatty acids with the negative health implications of *trans* fatty acids.

However, the Foundation does not support the National Academy of Science Institute of Medicine's (IOM) recent advisory that nutrition labeling for foods list a combined Daily Value (DV) for saturated and trans fatty acids. The IOM ostensibly included this recommendation "so consumers will know that both contribute to cardiac health risk."[73] The IOM said that a combined DV for saturated and trans fat would help educate the consumer that, although the two components are chemically different, "neither is desirable in terms of [cardiac health risk]." The Foundation finds this advisory to be ill-advised and ill-considered, considering the negative health implications of *trans* fatty acids and the healthful aspects of saturated fats.

Essential Fatty Acids

Essential fatty acids are required for human and animal life. The body cannot make the most common form of EFA's - omega-3 and omega-6 essential fatty acids - and must be provided by the diet. EFA's are precursor molecules to prostaglandins, which are locally produced hormones that control different physiological functions. Essential fatty acids and their elongated forms are part of the structural matrix of the cell membrane along with many other fatty acids.

Problems associated with an excess polyunsaturated consumption are exacerbated by the fact that most polyunsaturates in commercial vegetable oils are in the form of omega-6 linoleic essential fatty acid (EFA), with very little of vital omega-3 linolenic EFA. Some of the published research has shown that we currently consume a ratio of omega-6 to omega-3 of 20 to one, far beyond the beneficial range of one to one to four to one.

Analyses have revealed that too much omega-6 in the diet creates an imbalance that can interfere with production of important prostaglandins.[74] This disruption can result in increased tendency to form blood clots, inflammation, high blood pressure, irritation of

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the digestive tract, depressed immune function, sterility, cell proliferation, cancer and weight gain.[75]

A number of researchers have argued that along with a surfeit of omega-6 fatty acids the American diet is deficient in the more unsaturated omega-3 linolenic acid. This fatty acid is necessary for cell oxidation, for metabolizing important sulphur-containing amino acids and for maintaining proper balance in prostaglandin production. Deficiencies have been associated with asthma, heart disease and learning deficiencies.[76]

Modern agricultural and industrial practices have reduced the amount of omega-3 fatty acids in commercially available vegetables, eggs, fish and meat. For example, organic eggs from hens allowed to feed on insects and green plants can contain omega-6 and omega-3 fatty acids in the beneficial ratio of approximately between one-to-one to four to one; but commercial supermarket eggs can contain as much as nineteen times more omega-6 than omega-3.[77] Factory farmed cattle are fed grains rich in omega-6 EFAs in order to achieve maximum size in the least amount of time. The result is that grain-fed beef have almost undetectable amounts of omega-3 EFAs, while grass-fed cattle contain the beneficial ratios.[78]

Modern diets can contain as much as 30% of calories as polyunsaturated oils, but scientific research indicates that this amount is far too high. The best evidence indicates that our intake of polyunsaturates should not be much greater than 4% of the caloric total, in approximate proportions of 1 1/2 % omega-3 linolenic acid and 2 1/2 % omega-6 linoleic acid.[79]

In the last 100 years, since the advent of liquid vegetable oils and trend towards grain-fed livestock escalated, there has been an unprecedented shift in the balance of essential fatty acids in our diet. According to Dr. Mitra Ray, "To my knowledge, there is no precedent for such a drastic change in diet over such a short period of time."[80]

It should be noted that the Office of Management and Budget recently requested that information about the benefits of omega 3 essential fatty acids and what kinds of foods are sources of this EFA (fish oils and flaxseed oil) be incorporated into the Dietary Guidelines and Food Pyramid.[81]

When you lower the amount of fat in the diet, you must raise something else. That something else is usually carbohydrate, and invariably today it would be mostly simple carbohydrates such as white flour, corn syrup or refined sugar.

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CARBOHYDRATES

The Guidelines state that carbohydrates should comprise between 45 to 65 percent of food intake by calories. Carbohydrates provide fuel for the body in the form of glucose, which is a sugar. There are two types of carbohydrates -- simple and complex. Simple carbohydrates are sugars, such as the ones found in candy, fruits and baked goods. Complex carbohydrates are starches found in beans, nuts, vegetables and whole grains.

Sugar comes in many forms. Sucrose, or common table sugar, is a disaccharide, which breaks down during digestion into the simple sugars glucose and fructose. Glucose is the primary sugar in the blood; fructose is the primary sugar in fruit and high fructose corn syrup. Other common disaccharides are maltose (malt sugar) and lactose (milk sugar). Chemical terms ending in *-ose* indicate a sugar.

Complex sugars are longer-chain sugars composed of fructose and other simple sugars. Relatively short complex sugars called stachynose and raffinose occur in beans and other legumes; longer ones occur in certain plant foods like the Jerusalem artichoke and seaweed. Unlike herbivorous animals, humans lack digestive enzymes needed to break down these sugars into their simple components. Cooking breaks down these complex sugars to a certain extent.

In contrast, most humans are able to digest starch, a polysaccharide composed exclusively of glucose molecules. During the process of cooking, chewing and especially through prolonged enzymatic action during digestion, the starches are broken into separate glucose molecules. Glucose enters the bloodstream via the small intestine where it supplies energy wherever the body needs it—for accomplishing cellular processes, for thinking or for moving an arm or a leg.

As the body uses glucose for all its processes, it can be said that sugar is essential to life. But the body does not need to ingest sugar, or even large quantities of carbohydrates, to produce it. Certain isolated traditional groups, such as the Eskimos, the pre-Columbian plains Indians and the medieval inhabitants of Greenland, subsisted on diets composed almost entirely of animal products—protein and fats. Examination of the skulls of these groups shows a virtual absence of tooth decay, indicative of a high general level of health on a diet almost completely devoid of carbohydrate foods.

Only during the last century has man's diet included a high percentage of refined carbohydrates. Our ancestors ate fruits and grains in their whole, unrefined state. *In nature, sugars and carbohydrates—the energy providers—are linked together* with vitamins, minerals, enzymes, protein, fat and fiber—the bodybuilding and digestion-regulating components of the diet. In whole form, carbohydrates support life, but refined carbohydrates are inimical to life because they are devoid of bodybuilding elements.

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Refined Carbohydrates

Digestion of refined carbohydrates calls on the body's own store of vitamins, minerals and enzymes for proper metabolization. When B vitamins are absent, for example, the breakdown of carbohydrates cannot take place, yet most B vitamins are removed during the refining process.

The refining process strips grains, vegetables and fruits of both their vitamin and mineral components. Refined carbohydrates have been called "empty" calories. "Negative" calories is a more appropriate term because consumption of refined calories depletes the body's precious reserves.

Whole grains provide vitamin E, B vitamins in abundance, and many important minerals, all of which are essential to life. These are discarded in the refining process. Fiber—indigestible cellulose that plays an important role in digestion and elimination—is also removed. Refined flour is commonly fortified, but this is of little value. Fortification adds a handful of synthetic vitamins and minerals to white flour and polished rice after a host of essential factors have been removed or destroyed. Some of the vitamins added during the fortification process may even be dangerous. Some researchers believe that excess iron from fortified flour can cause tissue damage, and other studies link excess or toxic iron to heart disease.[82] Vitamins B_1 and B_2 added to grains without B_6 lead to imbalances in numerous processes involving B vitamin pathways. The safety of bromating and bleaching agents, almost universally applied to white flour, has never been established.

The Foundation recommends the use of a variety of whole grains but with an important caveat. Phosphorus in the bran of whole grains is tied up in a substance called phytic acid. Phytic acid combines with iron, calcium, magnesium, copper and zinc in the intestinal tract, blocking their absorption.[83] Whole grains also contain enzyme inhibitors that can interfere with digestion. Traditional societies usually soak or ferment their grains before eating them, processes that neutralize phytates and enzyme inhibitors and, in effect, predigest grains so that all their nutrients are more available.[84] Sprouting, overnight soaking and old-fashioned sour leavening can accomplish this important predigestion process in our own kitchens. Many people who are allergic to grains will tolerate them well when they are prepared according to these procedures. Proper preparation techniques also help break down complex sugars in legumes, making them more digestible.

Whole grains that have been processed by high heat and pressure to produce puffed wheat, oats and rice are actually quite toxic and have caused rapid death in test animals.[85] Breakfast cereals that have been slurried and extruded at high temperatures and pressures to make little flakes and shapes should also be avoided. Most, if not all, nutrients are destroyed during processing, and they are very difficult to digest. Studies show that these extruded whole grain preparations can have even more adverse effects on the blood sugar than refined sugar and white flour.[86] The process leaves phytic acid

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intact but destroys phytase, an enzyme that breaks down some of the phytic acid in the digestive tract.

Consumption of sugar and white flour may be likened to drawing on a savings account. If continued withdrawals are made faster than new funds are put in, the account will eventually become depleted. Some people may go longer than others without overt suffering, but eventually all will feel the effects of this inexorable law. If you were fortunate enough to be born with an excellent constitution, you may be able to eat unlimited quantities of sugar with relative impunity, but your children's or your grandchildren's inheritance will be one of impoverished reserves.

The all-important level of glucose in the blood is regulated by a finely tuned mechanism involving insulin secretions from the pancreas and hormones from several glands, including the adrenal glands and the thyroid. When sugars and starches are eaten in their natural, unrefined form, as part of a meal containing beneficial and unrefined fats and protein, they are digested slowly and enter the bloodstream at a moderate rate over a period of several hours. If the body goes for a long time without food, this mechanism will call upon reserves stored in the liver. When properly working, this blood sugar regulation process provides our cells with a steady, even supply of glucose. The body is kept on an even keel, so to speak, both physically and emotionally.

But when we consume refined sugars and starches, particularly alone, without fats or protein, they enter the blood stream in a rush, causing a sudden increase in blood sugar. The body's regulation mechanism kicks into high gear, flooding the bloodstream with insulin and other hormones to bring blood sugar levels down to acceptable levels. Repeated onslaughts of sugar will eventually disrupt this finely tuned process, causing some elements to remain in a constant state of activity and others to become worn out and inadequate to do the job. A diet high in refined carbohydrates stimulates an abnormal pancreatic insulin response in order to moderate blood sugar levels, while high sugar intake may also increase adrenal cortisone and cholesterol levels. Constant high intake of simple dietary sugar over-stimulates or "burns out" normal, healthy pancreas and adrenal function.

The situation is exacerbated by the fact that a diet high in refined carbohydrates will also be deficient in vitamins, minerals and enzymes, those bodybuilding elements that keep the glands and organs in good repair. When the endocrine system thus becomes disturbed, numerous other pathological conditions soon manifest—degenerative disease, allergies, obesity, alcoholism, drug addiction, depression, learning disabilities and behavioral problems.

Sugars

As the consumption of sugar has increased, so have all the "civilized" diseases. In 1821, the average sugar intake in America was 10 pounds per person per year; today it is 170 pounds per person, representing over one-fourth the average caloric intake.[87] Another large portion of total calories comes from white flour and

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refined vegetable oils.[88] This means that less than half the diet must provide all the nutrients to a body that is under constant stress from its intake of sugar, white flour and rancid and hydrogenated vegetable oils. Herein lies one of the root causes of the vast increase in degenerative diseases that plague modern America.

Sweetness in fruits, grains and vegetables is an indication that they are ripe and have reached maximum vitamin and mineral content. The naturally sweet foods from which sugar is extracted—sugar beet, sugar cane and corn—are particularly high in nutrients such as B vitamins, magnesium and chromium. All of these seem to play an important role in the blood sugar regulation mechanism. These nutrients are discarded—or made into animal feed—when the raw product is refined into sugar. Refining strips foods of vital nutrients while concentrating sugars, thus allowing us to fulfill our body's energy requirements without obtaining the nutrients needed for bodybuilding, digestion and repair.

Scientific evidence against sugar has been mounting for decades. As early as 1933, research showed that increased consumption of sugar caused an increase in various disease conditions in school children.[89] Sugar, especially fructose, has been shown to shorten life in numerous animal experiments.[90] Sugar consumption has recently been cited as the root cause of anorexia and eating disorders.[91] In the 1950s, British researcher Yudkin published persuasive findings that excessive use of sugar was associated with the following conditions: release of free fatty acids at the aorta; rise in blood cholesterol; rise in triglycerides; increase in adhesiveness of the blood platelets; increase in blood insulin levels; increase in blood corticosteroid levels; increase in gastric acidity; shrinkage of the pancreas and enlargement of the liver and adrenal glands.[92]

Numerous subsequent studies have positively correlated sugar consumption with heart disease.[93] These results are far more unequivocal than the presumed association of heart disease with saturated fats. Researchers Lopez in the 1960s and Ahrens in the 1970s have repeatedly pointed out the role of sugar as a cause of coronary heart disease, but their work has not received recognition by government agencies or by the press.

Sugar consumption is a cause of bone loss and dental decay. Tooth decay and bone loss occur when the precise ratio of calcium to phosphorus in the blood varies from the normal ratio of four parts phosphorus to ten parts calcium. At this ratio, all blood calcium can be properly utilized. Dr. Melvin Page, a Florida dentist, demonstrated in numerous studies that sugar consumption causes phosphorus levels to drop and calcium to rise.[94] Calcium rises because it is pulled from the teeth and the bones. The drop in phosphorus hinders the absorption of this calcium, making it unusable and therefore toxic. Thus, sugar consumption causes tooth decay not because it promotes bacterial growth in the mouth, as most dentists believe, but because it alters the internal body chemistry.

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More health issues than heart disease and dental decay can be laid at sugar's door. A survey of medical journals in the 1970s produced findings implicating sugar as a causative factor in kidney disease, liver disease, shortened life span, increased desire for coffee and tobacco, atherosclerosis and coronary heart disease.[95] Sugar consumption is associated with hyperactivity, behavior problems, lack of concentration and violent tendencies.[96] Sugar consumption encourages the overgrowth of *candida albicans*, a systemic fungus in the digestive tract, causing it to spread to the respiratory system, tissues and internal organs. Sugar consumption is positively associated with cancer in humans and test animals.[97] Tumors are known to be enormous sugar absorbers.

Moderate use of natural sweeteners is found in many traditional societies. Thus it is perfectly acceptable to satisfy your sweet tooth by eating fully ripened fruit in season and limited amounts of certain natural sweeteners high in vitamins and minerals, such as raw honey, date sugar, dehydrated cane sugar juice and maple syrup. Avoid all refined sugars including table sugar, so-called raw sugar or brown sugar (both composed of about 96 percent refined sugar), corn syrup, fructose and large amounts of fruit juice.

Research indicates that it is the fructose, not the glucose, moiety of sugar that is the most harmful, especially for growing children.[98] Yet the greatest increase in sugar consumption during the last two decades is from high fructose corn syrup used in soft drinks, ketchup and many other fabricated foods aimed at children.

High Fructose Corn Syrup

For many years, Dr. Meira Fields and her coworkers at the U.S. Department of Agriculture investigated the harmful effects of dietary sugar on rats. They discovered that when male rats are fed a diet deficient in copper, with sucrose as the carbohydrate, they develop severe pathologies of vital organs. Liver, heart and testes exhibit extreme swelling, while the pancreas atrophies, invariably leading to death of the rats before maturity.[99]

Sucrose is a disaccharide composed of 50 percent glucose and 50 percent fructose. Dr. Fields repeated her experiments to determine whether it was the glucose or fructose moiety that caused the harmful effects. Starch breaks down into glucose when digested. On a copper-deficient diet, the male rats showed some signs of copper deficiency, but not the gross abnormalities of vital organs that occur in rats on the sucrose diet. When the rats were fed fructose, the fatal organ abnormalities occurred.

Lysl oxidase is a copper-dependent enzyme that participates in the formation of collagen and elastin. Fructose seems to interfere with copper metabolism to such an extent that collagen and elastin cannot form in growing animals—hence the hypertrophy of the heart and liver in young males. The females did not develop these abnormalities, but they were reabsorbed into their litters.

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These experiments should give us pause when we consider the great increase in the use of high fructose corn syrup during the past 30 years, particularly in soft drinks, fruit juices and other beverages aimed at growing children, children increasingly likely to be copper deficient as modern parents no longer serve liver to their families. (Liver is by far the best source of copper in human diets.)

"The bodies of the children I see today are mush," observed a concerned chiropractor recently. The culprit is the modern diet, high in fructose and low in copper-containing foods, resulting in inadequate formation of elastin and collagen—the sinews that hold the body together.

Until the 1970s most of the sugar we ate came from sucrose derived from sugar beets or sugar cane. Then sugar from corn—corn syrup, fructose, dextrose, dextrine and especially high fructose corn syrup (HFCS)—began to gain popularity as a sweetener because it was much less expensive to produce. High fructose corn syrup can be manipulated to contain equal amounts of fructose and glucose, or up to 80 percent fructose and 20 percent glucose.[100] Thus, with almost twice the fructose, HFCS delivers a double danger compared to sugar.

(With regards to fruit, the ratio is usually 50 percent glucose and 50 percent fructose, but most commercial fruit juices have HFCS added. Fruit contains fiber, which slows down the metabolism of fructose and other sugars, but the fructose in HGCS is absorbed very quickly.)

In 1980 the average person ate 39 pounds of fructose and 84 pounds of sucrose. In 1994 the average person ate 66 pounds of sucrose and 83 pounds of fructose, providing 19 percent of total caloric energy.[101] Today approximately 25 percent of our average caloric intake comes from sugars, with the larger fraction as fructose.[102]

High fructose corn syrup is extremely soluble and mixes well in many foods. It is cheap to produce, sweet and easy to store. It's used in everything from bread to pasta sauces to bacon to beer as well as in "health products" like protein bars and "natural" sodas.

In the past, fructose was considered beneficial to diabetics because it is absorbed only 40 percent as quickly as glucose and causes only a modest rise in blood sugar.[103] However, research on other hormonal factors suggests that fructose actually promotes disease more readily than glucose. Glucose is metabolized in every cell in the body but all fructose must be metabolized in the liver.[104] The livers of test animals fed large amounts of fructose develop fatty deposits and cirrhosis, similar to problems that develop in the livers of alcoholics.

Pure fructose contains no enzymes, vitamins or minerals and robs the body of its micronutrient treasures in order to assimilate itself for physiological use.[105] While naturally occurring sugars, as well as sucrose, contain fructose bound to other sugars, high fructose corn syrup contains a good deal of "free" or unbound fructose. Research indicates that this free fructose interferes with the heart's use of key minerals like

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magnesium, copper and chromium. Among other consequences, HFCS has been implicated in elevated blood cholesterol levels and the creation of blood clots. It has been found to inhibit the action of white blood cells so that they are unable to defend the body against harmful foreign invaders.[106]

Studies on the Maillard reaction indicate that fructose may contribute to diabetic complications more readily than glucose. The Maillard reaction is a browning reaction that occurs when compounds are exposed to various sugars. Fructose browns food seven times faster than glucose, resulting in a decrease in protein quality and a toxicity of protein in the body.[107] This is due to the loss of amino acid residues and decreased protein digestibility. Maillard products can inhibit the uptake and metabolism of free amino acids and other nutrients such as zinc, and some advanced Maillard products have mutagenic and/or carcinogenic properties. The Maillard reactions between proteins and fructose, glucose, and other sugars may play a role in aging and in some clinical complications of diabetes.[108]

Fructose reduces the affinity of insulin for its receptor, which is the hallmark of type-2 diabetes. This is the first step for glucose to enter a cell and be metabolized. As a result, the body needs to pump out more insulin to handle the same amount of glucose.[109]

Nancy Appleton, PhD, clinical nutritionist, has compiled a list of the harmful effects of fructose in her books *Lick the Sugar Habit, Healthy Bones, Heal Yourself With Natural Foods, The Curse Of Louis Pasteur* and *Lick the Sugar Habit Sugar Counter.* She points out that consumption of fructose causes a significant increase in the concentration of uric acid; after ingestion of glucose, no significant change occurs. An increase in uric acid can be an indicator of heart disease.[110] Furthermore, fructose ingestion in humans results in increases in blood lactic acid, especially in patients with preexisting acidotic conditions such as diabetes, postoperative stress or uremia. Extreme elevations cause metabolic acidosis and can result in death.[111]

Fructose is absorbed primarily in the jejunum before metabolism in the liver. Fructose is converted to fatty acids by the liver at a greater rate than is glucose.[112] When consumed in excess of dietary glucose, the liver cannot convert all of the excess fructose in the system and it may be malabsorbed. The portion that escapes conversion may be thrown out in the urine. Diarrhea can be a consequence.[113] A study of 25 patients with functional bowel disease showed that pronounced gastrointestinal distress may be provoked by malabsorption of small amounts of fructose.[114]

Fructose interacts with oral contraceptives and elevates insulin levels in women on "the pill.[115]

In studies with rats, fructose consistently produces higher kidney calcium concentrations than glucose. Fructose generally induces greater urinary concentrations of phosphorus and magnesium and lowered urinary pH compared with glucose.[116]

In humans, fructose feeding leads to mineral losses, especially higher fecal excretions of iron and magnesium, than did subjects fed sucrose. Iron, magnesium, calcium, and

zinc balances tended to be more negative during the fructose-feeding period as compared to balances during the sucrose-feeding period.[117]

There is significant evidence that high sucrose diets may alter intracellular metabolism, which in turn facilitates accelerated aging through oxidative damage. Scientists found that the rats given fructose had more undesirable cross-linking changes in the collagen of their skin than in the other groups. These changes are also thought to be markers for aging. The scientists say that it is the fructose molecule in the sucrose, not the glucose, that plays the larger part.[118]

Because it is metabolized by the liver, fructose does not cause the pancreas to release insulin the way it normally does. Fructose converts to fat more than any other sugar. This may be one of the reasons Americans continue to get fatter. Fructose raises serum triglycerides significantly. As a left-handed sugar, fructose digestion is very low. For complete internal conversion of fructose into glucose and acetates, it must rob ATP energy stores from the liver.[119]

Not only does fructose have more damaging effects in the presence of copper deficiency, fructose also inhibits copper metabolism—another example of the sweeteners double-whammy effect. A deficiency in copper leads to bone fragility, anemia, defects of the connective tissue, arteries, and bone, infertility, heart arrhythmias, high cholesterol levels, heart attacks, and an inability to control blood sugar levels.[120]

Although these studies were not designed to test the effects of fructose on weight gain, the observation of increased body weight associated with fructose ingestion is of interest. One explanation for this observation could be that fructose ingestion did not increase the production of two hormones, insulin and leptin, that have key roles in the long-term regulation of food intake and energy expenditure.[121]

See Appendix VI for a listing of the health effects of fructose.

The magnitude of the deleterious effects of fructose varies depending on such factors as age, sex, baseline glucose, insulin, triglyceride concentrations, the presence of insulin resistance, and the amount of dietary fructose consumed.[122] Some people are more sensitive to fructose. They include hypertensive, hyperinsulinemic, hypertriglyceridemic, non-insulin dependent diabetic people, people with functional bowel disease and postmenopausal women.[123]

According to a recent *Wall Street Journal* article, childhood weight gain in America might be caused in good measure by "the sweetening of America."[124] **When sugar is consumed in high quantities as "liquid candy" (high fructose corn syrup in processed drinks and foods), unused amounts are stored as fat cells. The more carbohydrate that is eaten, the more fat the liver and adipose tissue make from any excess carbohydrate. The end product of much of the carbohydrate that is eaten is fat.** This fat is stored either for the short term or for long term, depending on

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the energy requirements of the body. Instead of burning this energy, sedentary children store more and more of the sugar as fat.[125]

High fructose corn syrup is the primary sweetener used in soft drinks, now readily available to children in school vending machines. The soft drink industry increased US production from 22 to 41 gallons of soft drinks per person a year between 1970 and 1997.

Teenagers and children, the industry's main targets, are among the largest consumers. In the past 10 years, soft drink consumption among children has almost doubled in the United States. Teenage boys now drink, on average, three or more cans of soda per day, and 10 percent drink seven or more cans a day. The average for teenage girls is more than two cans a day, and 10 percent drink more than five cans a day. A typical 20-ounce Coke contains zero fat, zero protein and 27 grams of carbohydrates, usually in the form of high fructose corn syrup.

There are an estimated 20,000 vending machines in schools nationwide, according to the National Automatic Merchandising Association. The USDA collected data on *vending machines in schools and reported that 88 percent of high schools, 61 percent* of middle schools and 14 percent of elementary schools have food or beverage vending machines for student use. Thirty-four percent of high schools and 15 percent of middle schools permit students to use school vending machines at any time, and 6 percent of elementary schools allow students to use vending machines during lunch.

Everyone should avoid over-exposure to fructose, but especially those listed above. One or two pieces of fruit per day is fine, but commercial fruit juices and any products containing high fructose corn syrup are more dangerous than sugar and should be removed from the diet.

Recently, the World Health Organization (WHO) recommended limiting intake of added sugars found in food and drink to no more than 10 percent of daily calories, a step the WHO said could help stop the worldwide rise in obesity that is fueling the growth of such chronic diseases as type 2 diabetes.[126] On the other hand, the Institute of Medicine of the National Academy of Sciences recently provided guidelines that recommended up to 25 percent of one's daily calories as added sugar.[127] The WHO recommendation is far stricter than the Institute of Medicine added sugar limit of 25 percent of calories, the average level found in today's American food intake.

The Foundation concurs with WHO guidelines, with the particular caveat that consumption of refined sugars and syrup be limited. Most of the carbohydrates consumed should be in the form of whole grains, legumes, fresh or frozen fruits and fresh or frozen vegetables.

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PROTEINS

Proteins are the building blocks of the animal kingdom. The human body assembles and utilizes about 50,000 different proteins to form organs, nerves, muscles and flesh. Enzymes—the managers and catalysts of all our biochemical processes—are specialized proteins. So are antibodies.

All proteins are combinations of just 22 amino acids, eight of which are "essential" nutrients for humans, meaning that the human body cannot make them. When the essential amino acids are present in the diet, the body can usually build the other "nonessential" amino acids; however, if just one essential amino acid is low or missing, the body is unable to synthesize the other proteins it needs, even when overall protein intake is high. Of particular importance to the health of the brain and nervous system are the sulphur-containing amino acids—methionine, cysteine and cystine—found most plentifully in eggs and meat. Some individuals cannot manufacture amino acids considered "nonessential," such as taurine and carnitine, but must obtain them from dietary sources, namely red meat.

Protein is essential for normal growth, for the formation of hormones, for the process of blood clotting and for the formation of milk during lactation. Protein helps regulate the acid-alkaline balance of tissues and blood. When protein is lacking in the diet, there is a tendency for the blood and tissues to become either too acid or too alkaline, depending on the acidity or the alkalinity of the foods eaten.

Just as animal fats are our only sources of vitamins A and D and other bodybuilding factors, so also animal protein is our only source of complete protein. All of the essential amino acids, and many considered "nonessential," are present in animal products. Sources of protein from the vegetable kingdom contain only incomplete protein; that is, they are low in one or more essential amino acids, even when overall protein content is high. The body must ingest all the essential amino acids in order to use any of them.

The two best sources of protein in the vegetable kingdom are legumes and cereal grains, but all plant foods are low in tryptophan, cystine and threonine. Legumes, such as beans, peanuts and cashews are high in the amino acid lysine but low in methionine. Cereal grains have the opposite profile. In order to obtain the best possible protein combination from vegetable sources, pulses and grains should be eaten together and combined with at least a small amount of animal protein. Most grain-based cuisines instinctively incorporate this principle. For example, animal products plus corn and beans are staple fare in Mexican cuisine, as are chickpeas and whole wheat in the Middle East.

Scientific evidence, honestly evaluated, argues against relying too heavily on grains and legumes as sources of protein or for severely reducing animal products in the diet. Our primitive ancestors subsisted on a diet composed largely of meat and fat, augmented with vegetables, fruit, seeds and nuts. Studies of their remains

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reveal that they had excellent bone structure, heavy musculature and flawless teeth. Agricultural man added milk, grains and legumes to this diet. These foods allowed him to pursue a more comfortable life style than the hunter-gatherer, but at a price. In his studies of isolated "primitive" peoples, Dr. Weston A. Price found that those whose diets consisted largely of grains and legumes, while far healthier than civilized moderns, had, nevertheless, more dental caries than those living primarily on meat and fish. Skulls of prehistoric peoples subsisting almost entirely on vegetable foods have teeth containing caries and abscesses and show evidence of bone problems and tuberculosis as well.[128]

A study by Dr. Emmanuel Cheraskin corroborates Dr. Price's observations. He surveyed 1040 dentists and their wives. Those who had the fewest problems and diseases as measured by the Cornell Medical Index had the most protein in their diets.[129] The claim that high-protein diets cause bone loss is supported neither by scientific research nor by anthropological surveys.[130] However, inadequate protein intake leads to loss of myocardial muscle and may therefore contribute to coronary heart disease.[131] However, protein cannot be adequately utilized without dietary fats. That is why protein and fats occur together in eggs, milk, fish and meats. A high-protein, *low fat diet can cause many problems including too rapid growth and depletion of* vitamin A and vitamin D reserves.[132]

Not only is it difficult to obtain adequate protein on a diet devoid of animal products, but such a diet often leads to deficiencies in many important minerals as well. This is because a largely vegetarian diet lacks the fat-soluble catalysts needed for mineral absorption. Furthermore, phytates in grains block absorption of calcium, iron, zinc, copper and magnesium. Unless grains are properly prepared to neutralize phytates, the body may be unable to assimilate these minerals. Zinc, iron, calcium and other minerals from animal sources are more easily and readily absorbed. We should not underestimate the dangers of deficiencies in these minerals. The effects of calcium and iron deficiency are well known, those of zinc less so. Even a minor zinc deficiency in pregnant animals results in offspring with deformities, such as clubfeet, cleft palates, *domed skulls and fused and missing ribs. In humans, zinc deficiency can cause learning* disabilities and mental retardation. In men, zinc depletion decreases fertility. Man's best source of zinc is animal products, particularly oysters and red meat.

Usable vitamin B_{12} occurs only in animal products. The body stores a supply of vitamin B_{12} that can last from two to five years. When this supply is depleted, B_{12} deficiency diseases result. These include pernicious anemia, impaired eyesight, panic attacks, schizophrenia, hallucinations and nervous disorders, such as weakness, loss of balance and numbness in the hands and feet. Vitamin B_{12} deficiency has been found in breast-fed infants of strict vegetarians.[133] Fermented soy foods and spirulina contain compounds that resemble B_{12}; however, humans do not absorb these forms because they are not picked up by the "intrinsic factor," a specialized protein secreted in the stomach that allows B_{12} to be assimilated. In fact, the plant forms of B_{12} may even create B_{12} deficiencies.[134] (Viability of the intrinsic factor depends on a number of factors including calcium status, pancreatic enzymes and proper pH in the upper

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intestine. The ability to assimilate B_{12} frequently declines with age so that many elderly people suffer from B_{12} deficiency even though they continue to eat animal products.)

Current wisdom dictates that Americans should at least reduce their consumption of red meats and the dark meat of birds because these meats contain more saturated fat than fish or white poultry meat; but even this stricture is ill advised, especially for those who tend to be anemic. Red meat is rich in iron and zinc, both of which play important roles in the body's use of essential fatty acids; and, as we have seen, consumption of saturated fat poses no threat to our health.

A few highly publicized studies have claimed a link between consumption of meat and saturated fats with cancer, especially cancer of the colon.[135] Studies claiming a correlation of animal product consumption with cancer do not stand up to careful scrutiny. In many of these studies, the databases combined saturated fats from animal sources with hydrogenated vegetable oils, known to be carcinogenic.[136] Furthermore, these studies did not include sugar and white flour in their surveys, even though researcher Lopez and others have shown that in industrialized countries high meat consumption and high sugar intake often occur together.[137] Actually, the pathway for colon cancer is well understood. It involves high levels of omega-6 linoleic acid and hydrogenated fats, which in the presence of carcinogens and acted on by certain enzymes in the cells lining the colon lead to tumor formation.[138] This explains why colon cancer is prevalent in some industrialized countries where there are many carcinogens in the diet and where consumption of vegetable oils and sugar is high; but in traditional societies, where sugar and vegetable oils are absent and the food is free of additives, meat-eating is not associated with cancer.

Refined Proteins

We have already seen that processing and refining can devitalize both fats and carbohydrates. The same can be said of proteins. Isolated protein powders made from soy, whey, casein and egg whites are currently popular as basic ingredients in diet beverages and many so-called health food products. **Protein isolates are usually obtained by a high-temperature process that over-denatures the proteins to such an extent that they become virtually useless.**[139] while increasing nitrates and other carcinogens.[140] Protein powders are often consumed as part of a low-fat diet and can thereby lead to depletion of vitamin A and D reserves. Soy protein isolates are high in mineral-blocking phytates, thyroid-depressing phytoestrogens and potent enzyme inhibitors that depress growth and cause cancer.[141]

Diets in which non-natural isolated powdered proteins from soy, eggs or milk are fed to animals or humans cause a negative calcium balance that can lead to osteoporosis. Critics of meat eating have seized on these results to claim that meat causes bone loss. But meat or milk—as opposed to protein powders—fed to human subjects do not cause calcium loss nor do they contribute to osteoporosis.[142] The healthy meat-eating groups studied by Weston Price did not show any evidence whatsoever of osteoporosis.

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In summary, animal products are important sources of bodybuilding elements in the diet. Furthermore, animal fats supply vitamin A and vitamin D and animal protein is rich in minerals, vitamin B_6 and vitamin B_{12}. The traditional groups of people studied by Dr. Price especially valued certain high-vitamin animal products like organ meats, butter, fish eggs and shellfish for growing children and for parents of both sexes during the childbearing years.

We cannot stress too highly that animal protein foods—meat, eggs and milk—always come with fat and this is how we should eat them. Animal fat supplies vitamins A and D needed for the assimilation of protein. Consumption of low fat milk products, egg whites and lean meat can lead to serious deficiencies of these vital fat-soluble nutrients.[143]

The amount of meat you include in your diet depends on your genetic makeup and on hormonal factors. Some people require more meat while others do not produce enough hydrochloric acid in their stomachs to handle large amounts very well. Some researchers claim that our need for protein declines in later years. Requirements for individual essential amino acids vary enormously. For example, dark-skinned people may need more tryptophan, found in eggs and dairy products, as this essential amino acid is used in the production of melanin; deficiencies may lead to insomnia, hyperactivity and other nervous disorders. Some individuals have high requirements for carnitine, a nonessential amino acid found plentifully in lamb or beef, because they have difficulty manufacturing enough of it for proper functioning of the heart.

Our endorsement of animal products must be tempered with this important caveat: The meat, milk and eggs in our supermarkets are highly contaminated and vastly inferior in nutritional quality to those available to our predecessors just a few decades ago. Modern cattle-raising techniques include the use of steroids to make meat tenderer and antibiotics that allow cattle to survive in crowded feedlots. Many cattle supplying meat to the American table have never seen the open range, and calves raised for veal are often confined to crates for the whole of their short lives. Diseased animals routinely pass inspection and find their way into the food supply. Chickens are raised in crowded pens, often under artificial light both night and day, and fed on substandard food. They, too, must be guarded from infection by antibiotics. Their eggs are inferior in nutritional qualities to those of free-range, properly nourished hens.

The kinds of proteins we eat are just as important as the types of fats and carbohydrates consumed. Grass fed beef, free range chickens and eggs, bacon and ham from non-factory farmed raised pigs, and fresh fish that is not factory farmed are to be consumed for their natural nutritional basis.

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EXCITOTOXINS

The last area the Foundations will comment on is that of excitotoxins. While not a macronutrient, excitotoxins play a significant role in the processing of foods consumed by Americans and our resultant levels of obesity. Excitotoxins are substances, usually acidic amino acids, which react with specialized receptors in the brain in such a way as to lead to destruction of certain types of neurons.[144]

Excitotoxins are present in almost all processed foods. In many cases they are being added in disguised forms, such as hydrolyzed vegetable protein, vegetable protein, textured protein, hydrolyzed plant protein, soy protein extract, caseinate, yeast extract, and natural flavoring. Basically, they are used to alter the taste of food.

We will focus on two excitotoxins: monosodium glutamate (MSG) and aspartame. MSG is glutamic acid that has been freed from protein through a manufacturing process what many MSG-sensitive people refer to as processed free glutamic acid and its disguised forms are used to enhance the taste of food. Aspartame and its breakdown-product, aspartic acid, is a non-nutritive artificial sweetener that is used as a substitute for sugar and high fructose corn syrup in diet soft drinks and many diet foods. About 40 percent of aspartame is aspartic acid.

Research has shown that when subtoxic levels of excitotoxins are given to animals in divided doses, they experience full toxicity, i.e. they are synergistic.[145] Also, liquid forms of excitotoxins, as occurring in soups, gravies and diet soft drinks, are more toxic than that added to solid foods because they are more rapidly absorbed and reach higher blood levels.[146]

Excitotoxins have been identified in playing a critical role in the development of a number of neurological disorders including migraines, seizures, infections, abnormal neural development, certain endocrine disorders, neuropsychiatric disorders, learning disorders in children, AIDS dementia, episodic violence, lyme borreliosis, hepatic encephalopathy, specific types of obesity, and especially the neurodegenerative diseases, such as ALS, Parkinson's disease, Alzheimer's disease, Huntington's disease, and olivopontocerebellar degeneration.[147]

Of particular concern are the toxic effects of excitotoxins on the developing brain. Research has established that the immature brain is four times more sensitive to the toxic effects of the excitatory amino acids as is the mature brain. This means that excitotoxic injury is of special concern from the fetal stage to adolescence. There is evidence that the placenta concentrates several of these toxic amino acids on the fetal side of the placenta. Consumption of aspartame and MSG containing products by pregnant women during this critical period of brain formation is of special concern and should be discouraged. Many of the effects, such as endocrine dysfunction and complex learning, are subtle and may not appear until the child is older. Other hypothalamic syndromes associated with early excitotoxic lesions include immune alterations and violence dyscontrol.[148]

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Monosodium Glutamate (MSG)

Glutamate is one of the more commonly known excitotoxins. Monosodium Glutamate (MSG) is the sodium salt of glutamate. This amino acid is a normal neurotransmitter in the brain. In fact, it is the most commonly used neurotransmitter by the brain. This is because, glutamate, as a neurotransmitter, exists in the extracellular fluid only in very, very small concentrations. When the concentration of this transmitter rises above this level the neurons begin to fire abnormally. At higher concentrations, the cells undergo a specialized process of delayed cell death known as excitotoxicity, that is, they are excited to death.

MSG is manufactured through a process of protein hydrolysis. When a product is 99% pure MSG, the product is called "monosodium glutamate" by the FDA and must be labeled as such. However, when a hydrolyzed protein contains less than 99% MSG, the FDA does not require that the MSG be identified. "Autolyzed yeast," "hydrolyzed soy protein," and "sodium caseinate," are examples of names given to hydrolyzed proteins on food labels. Under FDA regulation, hydrolyzed protein products may be used as ingredients in other products without mention of the original hydrolyzed protein product. For example, "hydrolyzed soy protein," when used in "flavoring(s)," "natural flavoring(s)," "natural flavor(s)," and products called broth, bouillon, or natural chicken flavoring, etc., does not have to be mentioned on product labels when the food processor claims that the hydrolyzed protein is being used for purposes other than flavoring.[149]

See Appendix VII for a list of ingredients that contain enough MSG to serve as common MSG-reaction Triggers.

MSG was not used in our country to any extent until the late 1940s, and not used widely until the 1960s, when the Ajinomoto Company introduced MSG made by bacterial fermentation. (Ajinomoto Company is the world's largest producer of the food ingredient monosodium glutamate.) Today, most processed foods contain MSG and it is even found in personal care items and pharmaceuticals.

MSG is found in most soups, salad dressings, and processed meats; in some crackers, bread, canned tuna fish, most frozen entrees, ice cream, and frozen yogurt. It is often used in low fat foods to make up for the flavor lost when fat is reduced or eliminated.[150] More than 30 percent of the U.S. population is estimated to suffer adverse reactions to MSG in an ordinary diet.[151]

In 1968, John W. Olney, M.D., a respected researcher at Washington University Medical School, St. Louis, Missouri, and member of the National Academy of Science, replicated a 1957 study by Lucas and Newhouse[152] in which the administration of MSG had resulted in retinal damage in mice. Olney observed that the mice fed MSG became grotesquely obese. Dr. Olney decided to sacrifice some of the mice and found lesions in the hypothalamus portion of the brain, the portion of the brain that is ". . . prominently involved in the functions of the autonomic (visceral motor) nervous system and, through

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its vascular link with the anterior lobe of the hypophysis, in endocrine mechanisms; it also appears to play a role in neural mechanisms underlying moods and motivational states."[153]

Dr. Olney published a paper on his findings in 1969, in which he described the hypothalamic lesions, stunted skeletal development, and obesity in maturing mice which had been given the food ingredient "monosodium glutamate" as neonates. Olney also commented on observed pathological changes found in several brain regions associated with endocrine function in maturing mice.[154]

Since 1969, many scientists have confirmed Dr. Olney's findings of damage to the hypothalamus from MSG with resulting obesity. The National Library of Medicine website, www.pubmed.gov, cites 151 studies listed in addition to Dr. Olney's study. More research has been done on the effects of MSG than aspartic acid on the hypothalamus[155,156]; however, neuroscientists have found in animal studies that glutamic acid and aspartic acid load on the same receptors in the brain, cause identical brain lesions and neuroendocrine disorders, and act in an additive fashion.[157]

Research indicating that MSG causes damage to the hypothalamus has been carried out mostly on small laboratory animals, primarily the mouse and the rat. In the 1960s, a few studies looked at the effects of MSG on primates. The findings were the same for rhesus monkeys as they were for rodents.[158,159] Although research designed to produce brain lesions cannot be carried out on humans, neuroscientists have determined that humans are five times more sensitive to MSG than the mouse and 20 times more sensitive to MSG than the monkey, based on blood plasma levels of glutamate following an oral dose of 150 mg/kg of glutamic acid.[160] Furthermore, individual variability in plasma response to glutamate loading is more extreme in humans than in the mouse or monkey.[161]

Scientists have known that MSG and aspartic acid cause lesions in the hypothalamus resulting in obesity since 1969, but only recently has a possible explanation for the mechanism by which this occurs come to light. In 1994, researchers discovered the appetite-suppressing hormone leptin. As described in many articles, leptin regulates, among other things, energy, control of appetite and body weight. Leptin acts by altering neuropeptide circuits in the hypothalamus.[162,163,164,165,166,167]

While there is abundant literature demonstrating that MSG and aspartic acid cause hypothalamic lesions which, in turn, can cause gross obesity, research has yet to be carried out that examines a possible relationship between the hypothalamic damage caused by MSG and/or aspartame, and the leptin abnormalities found in obese individuals. Research is required in this area.

The glutamate industry would like us to believe that MSG is not a problem for humans because the human brain is protected from MSG by the blood-brain barrier. However, we do not believe this is true. The blood-brain barrier is not fully developed in newborns, and researchers do not know at which age it becomes fully developed. Some evidence

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indicates that the blood-brain barrier is not fully developed in some children until puberty.[168]

It is definitely not fully developed in any fetus. Furthermore, throughout life, certain regions of the brain, known as the circumventricular organs, lack a blood-brain barrier[169,170,171], and the blood-brain barrier can be damaged from high fever, stroke, trauma to the head, seizures, repeated ingestion of MSG, and the normal process of aging.[172,173,174]

The developing fetus is at particular risk since the placental barrier is not impervious to MSG[175,176,177]; and we can assume the same is true for the aspartic acid contained in aspartame. Since most of the processed foods we eat contain MSG, as do many personal care items, supplements and pharmaceuticals, it is almost impossible for an expectant mother to avoid it. She may also be using aspartame in diet soda or as a sweetener in coffee and/or ingesting free glutamic acid or free aspartic acid as a chelating agent in the minerals included in her multi-vitamin preparation.

Following birth, an infant is exposed to MSG in most, if not all, of the vaccines it is given, and in most cases is also exposed to free aspartic acid in vaccines.[178] The effect of the glutamic acid in vaccines is intensified by any mercury that is also present.[179] (Until recently, most infant vaccines contained the preservative thimerosol, a mercury-based compound.)

All infant formulas contain some free glutamic acid and free aspartic acid. An infant on a hypoallergenic soy-based formula will ingest more excitotoxic amino acids (glutamic acid, aspartic acid, and L-cysteine) per day than is contained in any serving of food that is typically seen on grocery store shelves.[180] (We understand hypoallergenic soy formulas are now being used by 25 percent of mothers because they have been led to believe that soy formulas are better for their babies than are milk-based formulas, even if their children are not lactose intolerant.) If an infant is breast fed, it appears likely that the MSG and/or aspartame ingested by the mother will pass into her milk. If the infant becomes ill, he may receive a medication sweetened with aspartame. As soon as the infant begins to eat processed foods, the infant will be ingesting free glutamic acid, and, in many cases, free aspartic acid.

The glutamate industry claims that glutamic acid and aspartic acid are natural components of protein and, therefore, cannot be harmful. What they fail to mention is that when glutamic acid and aspartic acid are freed from protein through a manufacturing process, they will invariably be accompanied by contaminants. If the manufacturing process used to free amino acids from protein is acid hydrolysis, carcinogenic propanols will be included as contaminants.[181] In a speech before The Celiac Sprue Association in 2000, an FDA researcher reported that in freeing L-tryptophan from protein, certain contaminants are produced, and it is now believed that those who died or became ill from L-tryptophan in the late 1980s were people who were intolerant to those contaminants. (The FDA has suppressed that finding.)[182]

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In July, 1992, the Federation of American Societies for Experimental Biology (FASEB) issued its findings on an FDA-funded study entitled "Safety of Amino Acids Used as Dietary Supplements."[183] In the section on glutamic acid (the reactive component of the food ingredient "monosodium glutamate"), the report concludes, in part, "The continuing controversy over the potential effects of glutamate on growth and development of neonatal animal models suggests that it is prudent to avoid the use of dietary supplements of L-glutamic acid by pregnant women, infants and children. The existence of evidence of potential endocrine responses; i.e., elevated cortisol and prolactin, . . . *would also suggest a neuroendocrine link and that supplemental L-glutamic acid should* be avoided by women of child bearing age and individuals with affective disorders."

The FDA appears to have suppressed this FASEB report. When asked how the FDA can allow MSG to be used in food, FDA officials stated that one cannot compare the free glutamic acid in supplements to the free glutamic acid in food. Of course, this position is completely untenable since food products contain far more free glutamic acid than supplements.

Following issuance of the FASEB report on supplements, the FDA contracted with FASEB to conduct a study on the safety of MSG in food. In July, 1995, FASEB published its report entitled "Analysis of Adverse Reactions to Monosodium Glutamate (MSG)."[184] Most people, and the media, received a 20 page "Executive Summary," *primarily made up of questions developed by the FDA and the answers to those* questions. The carefully crafted summary left readers with the impression that MSG was essentially safe.

What is not generally known about the FASEB report on the safety of MSG in food is that the original draft final report was issued to the FDA in September, 1994 and leaked to the glutamate industry. The glutamate industry was not happy with FASEB's report and the FDA rejected it. The FDA asked FASB to "clarify" the report, leading to the final report, dated July, 1995. A reading of the entire July, 1995, FASEB report (over 350 pages long rather than the 20 pages making up the Executive Summary), will not give the reader the impression that MSG is safe.

Aspartame

The substances which will be discussed here are often referred to on product labels by many (seemingly) interchangeable terms: artificial/synthetic sweeteners, sugar alternatives, alternative sweeteners, non-nutritive sweeteners, non-caloric/low-cal/low-carb sweeteners, diabetic-safe sweeteners, etc. Many of these terms seem to be used as synonyms.[185]

According to the American Dietetic Association (ADA): "Although sweeteners can be grouped a number of different ways, the grouping "nutritive" and "non-nutritive" *acknowledges a difference in the amount of energy provided by sweeteners. Nutritive* sweeteners include sugar sweeteners (e.g., refined sugars, high fructose corn syrup, crystalline fructose, glucose. . . concentrated fruit juice) and. . . sugar alcohols (e.g.,

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sorbitol, mannitol, xylitol, isomalt, and hydrogenated starch hydrolysates). Non-nutritive sweeteners (e.g., saccharin, aspartame, acesulfame-K. . . sucralose [and neotame]) offer no energy, and, as they sweeten with little volume, can also be referred to as high-intensity sweeteners. Both sugar alcohols and non-nutritive sweeteners can replace sugar sweeteners and are therefore termed macronutrient substitutes, sugar substitutes, sugar replacers, or alternative sweeteners.

"Some sweeteners are considered Generally Recognized As Safe (GRAS) ingredients and others are considered food additives. . . . The safety limit of food additives. . . (is) expressed as the acceptable daily intake (ADI), that is, the estimated amount per kilogram body weight that a person can safely consume every day over a lifetime without risk. . . ."[186]

The Food and Drug Administration (FDA) has approved five non-nutritive sweeteners: aspartame, saccharin, acesulfame K, sucralose and neotame.[187,188] The most widely used non-nutritive sweetener is aspartame, scientifically known as 1-aspartyl 1-phenylalanine methyl ester.[189] It was discovered by accident in 1965 by Mr. James Schlatter, a scientist who was working on new drugs to treat ulcers, when he licked his fingers to pick up a piece of paper and accidentally tasted the intense sweetness of the compound he had created.[190]

Aspartame is 180 times sweeter than sucrose (common table sugar).[191] According to the ADA: "Demand for aspartame in the United States rose from 8.4 million pounds in 1986 to 17.5 million pounds in 1992, a figure that represents more than 80 percent of the world demand. Although soft drinks account for more than 70 percent of aspartame consumption, this sweetener is added to more than 6,000 foods, personal care products, and pharmaceuticals.

Aspartame is approved for use in more than 100 nations.[192] It has been sold around the world under various brand names including NutraSweet, Equal, Spoonfuls, Canderel, Bienvia, NatraSweet and Miwon. Its widespread usage has left an extensive trail of complaints and documentation of its negative side effects. Consequently, there is a great deal to be said on the subject of aspartame.

Aspartame, a product of pharmaceutical company G.D. Searle & Company, was originally approved for dry goods on July 26, 1974, but objections filed by scientists and attorneys in August 1974 as well as investigations of G.D. Searle's research practices caused the FDA to put approval of aspartame on hold on December 5, 1974. Searle owned the original patent on aspartame and did the original laboratory studies on its safety. These studies turned out very badly and remain as some of the most damning evidence against aspartame's safety.[193] Two of Searle's own scientists, concerned about the safety of the new product, filed a formal objection to try to keep aspartame from coming to the market.[194] A team from the FDA conducted its own study of Searle's data and on the corpses of aspartame-poisoned mice, and issued a scathing document called the Bressler Report.[195]

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Aspartame was formally approved by the FDA for dry goods in 1981 and for carbonated beverages in 1983 under the Reagan Administration. In 1985, Monsanto purchased G.D. Searle and made Searle Pharmaceuticals and The NutraSweet Company separate subsidiaries.

Aspartame is a neurotoxic substance that has been associated with numerous health problems including dizziness, visual impairment, severe muscle aches, numbing of extremities, pancreatitis, high blood pressure, retinal hemorrhaging, seizures and depression. It is suspected of causing birth defects and chemical disruptions in the brain.[196]

Researchers at Utah State University found that even at low levels aspartame induces adverse changes in the pituitary glands of mice[197]. The pituitary gland is the master gland upon which the proper function of all biochemical processes depend.

When aspartame is digested it breaks down into the amino acids phenylalanine and aspartic acid, plus methanol. Methanol, or wood alcohol, is a known poison. Methanol is also found in fruit juices, and our regulatory agencies have seized upon this fact to assure us that the methanol by-product of aspartame is not harmful. They fail to point out that the methanol content of a diet soft drink is 15 to 100 times higher than that of fruit juices.[198]

The Environmental Protection Agency (EPA) defines the "safe consumption level" of methanol at 7.8 milligrams per day. One liter of a beverage sweetened with aspartame may contain as much as 56 milligrams of methanol.[199]

Other sources also link aspartame consumption with Parkinson 's disease, Alzheimer 's disease and the Gulf War Syndrome experienced by U.S. soldiers after serving in Iraq during Operation: Desert Storm.[200]

According to Dr. Christine Lydon, an aspartame researcher: "Aspartame's breakdown products, or metabolites, are even scarier than its components. Phenylalanine decomposes into diketopiperazine (DKP) a known carcinogen, when exposed to warm temperatures or prolonged storage. Even if products are consistently kept at cooler temperatures we are not safe. At cold temperatures, methanol will spontaneously give rise to a colorless toxin known as formaldehyde. Independent studies have shown formaldehyde formation, resulting from aspartame ingestion, to be extremely common. It accumulates within the cells, and reacts with cellular proteins such as enzymes and DNA. This cumulative reaction could spell grave consequences for those who consume aspartame-laden diet drinks and foods on a daily basis."[201]

Supporters of aspartame claim that the levels of methanol are not high enough to be worrisome and that phenylalanine and aspartic acid are of only limited concern. But there is no argument about the fact that phenylalanine, the largest component of aspartame by weight, is a danger to people who have a hereditary condition called phenylketonuria (PKU). These people must monitor or eliminate their intake of

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phenylalanine, which also occurs naturally in certain foods. The FDA recommends that pregnant and lactating women, people with advanced liver disease and phenylketonurics avoid products containing aspartame due to concern over metabolizing phenylalanine.

The FDA also admits that aspartic acid has the potential to cause brain damage at very high doses, but they assure us that "under normal intake levels, the brain's mechanism for controlling aspartic acid levels ensures no adverse effects."[202]

However, according to Dr. Lydon, "Phenylalanine and aspartic acid are amino acids that are normally supplied by the foods we eat; however, they can only be considered natural and harmless when consumed in combination with other amino acids. On their own, they enter the central nervous system in abnormally high concentrations, causing aberrant neuronal firing and potential cell death. The neurotoxic effects of these amino acids, when consumed as isolates, can be linked to headaches, mental confusion, balance problems and possibly seizures."[203]

While aspartame has been the subject of hundreds of FDA-approved studies, they clearly have not laid to rest the controversy surrounding its safety. Any adverse reaction to a food item that is regulated under the FDA's authority is supposed to be reported back to their Adverse Reaction Monitoring System (ARMS). As of 1995, over 75 percent of the adverse reactions reported to the ARMS were due to aspartame.[204] A 1995 report from the U.S, Department of Health and Human Services entitled "Symptoms Attributed to Aspartame in Complaints Submitted to the FDA" (opened to the public through the Freedom of Information Act) lists 92 separate categories of symptoms, including the frequency of each reported claim.[205]

The Material Safety Data Sheet on aspartame (CAS# 22839-47-0) says that to work with the aspartame, one should wear chemical goggles, protective gloves to prevent skin exposure, a chemical apron and a NIOS/MSHA approved air purifying dust or mist respirator.[206]

Clearly, excitotoxins are og major concern to our health and well-being. They are present in one form or another in all processed foods. While there is clear controversy of the health efficacy of MSG and aspartame, sufficient research exists pointing to caution when consuming these food additives.

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CONCLUSIONS

We, as a nation, have an immense opportunity to reverse the effects of the prevailing bubble on our health and well being. Obesity and overweight and concomitant diseases can be alleviated, but it will take a radical shifting of our current thinking on nutrition and food.

Over the long term, low-fat diets have been shown to be disadvantageous for preventing the diseases they have been recommended for. Most people are at risk for lowered intakes of the important fat-soluble vitamins and other fat-soluble nutrients when they consume low-fat diets for any length of time. So it would seem that the fat content of natural fats that our ancestors used, with an average of 35-40 percent of energy as fat, makes sense.

For those who are prone to hypoglycemia, seizures or who are recovering from an operation or illness, the percent of energy from fat should be higher. Growing infants and children also need a higher proportion of fat in the diet. Whatever level of fat works for an individual, it should be a mixture of natural fats that were common in the diets 60 and more years ago. Americans today consume in excess refined vegetable oils and *trans* fatty acids from partially hydrogenated vegetable oils.

The consumption of processed foods containing refined and partially hydrogenated vegetable oils, highly sugared food, especially those foods containing high fructose corn syrup, and excitotoxins such as MSG and aspartame should be limited as much as possible as well as highly processed protein sources. Naturally occurring unprocessed fruits, vegetables, whole grains and legumes with non-factory farmed animal and fish protein sources are recommended for longevity and well being. Beneficial fats include the primarily saturated butter and other animal fats, coconut and palm oils; monounsaturated fats such as olive oil and peanut oil; and the polyunsaturated omega-3 essential fatty acid from flaxseed oil and fish.

***In conclusion, the Weston A. Price Foundation urges the* U.S. Department Agriculture to abandon the current Food Pyramid concept. They should return to a plan that stresses high quality foods from four basic groups: animal foods, grains and legumes, fruits and vegetables, and beneficial oils and fats.**

We believe that by following these recommendations to the dietary guidelines, overweight and obesity, as well as many other health problems, will dramatically decrease in the United States.

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Appendix I

COMPOSITION OF DIFFERENT FATS

It is worthwhile examining the composition of vegetable oils and other animal fats in order to determine their usefulness and appropriateness in food preparation:

Duck and Goose Fat are semisolid at room temperature, containing about 35% saturated fat, 52% monounsaturated fat (including small amounts of antimicrobial palmitoleic acid) and about 13% *polyunsaturated fat. The proportion of omega-6 to omega-3 fatty acids depends on what the birds have* eaten. Duck and goose fat are quite stable and are highly prized in Europe for frying potatoes.

Chicken Fat is about 31% saturated, 49% monounsaturated (including moderate amounts of antimicrobial palmitoleic acid) and 20% polyunsaturated, most of which is omega-6 linoleic acid, although *the amount of omega-3 can be raised by feeding chickens flax or fish meal, or allowing them to range free* and eat insects. Although widely used for frying in kosher kitchens, it is inferior to duck and goose fat, which were traditionally preferred to chicken fat in Jewish cooking.

Lard or pork fat is about 40% saturated, 48% monounsaturated (including small amounts of antimicrobial palmitoleic acid) and 12% polyunsaturated. Like the fat of birds, the amount of omega-6 and omega-3 *fatty acids will vary in lard according to what has been fed to the pigs. In the tropics, lard may also be a* source of lauric acid if the pigs have eaten coconuts. Like duck and goose fat, lard is stable and a preferred fat for frying. It was widely used in America at the turn of the 20th century. It is a good source of vitamin D, especially in third-world countries where other animal foods are likely to be expensive. Some researchers believe that pork products should be avoided because they may contribute to cancer. Others *suggest that only pork meat presents a problem and that pig fat in the form of lard is safe and healthy.*

Beef and Mutton Tallows are 50-55% saturated, about 40% monounsaturated and contain small amounts of the polyunsaturates, usually less than 3%. Suet, which is the fat from the cavity of the animal, is 70-80% saturated. Suet and tallow are very stable fats and can be used for frying. Traditional cultures *valued these fats for their health benefits. They are a good source of antimicrobial palmitoleic acid.*

Olive Oil contains 75% oleic acid, the stable monounsaturated fat, along with 13% saturated fat, 10% omega-6 linoleic acid and 2% omega-3 linolenic acid. The high percentage of oleic acid makes olive oil ideal for salads and for cooking at moderate temperatures. Extra virgin olive oil is also rich in antioxidants. *It should be cloudy, indicating that it has not been filtered, and have a golden yellow color, indicating that* it is made from fully ripened olives. Olive oil has withstood the test of time; it is the safest vegetable oil you can use, but do not overdo. The longer chain fatty acids found in olive oil are more likely to contribute to the buildup of body fat than the short- and medium-chain fatty acids found in butter, coconut oil or palm kernel oil.

Peanut Oil contains 48% oleic acid, 18% saturated fat and 34% omega-6 linoleic acid. Like olive oil, peanut oil is relatively stable and, therefore, appropriate for stir-frys on occasion. But the high percentage of omega-6 presents a potential danger, so use of peanut oil should be strictly limited.

Sesame Oil contains 42% oleic acid, 15% saturated fat, and 43% omega-6 linoleic acid. Sesame oil is similar in composition to peanut oil. It can be used for frying because it contains unique antioxidants that are not destroyed by heat. However, the high percentage of omega-6 militates against exclusive use.

Safflower, Corn, Sunflower, Soybean and Cottonseed Oils all contain over 50% omega-6 and, except for soybean oil, only minimal amounts of omega-3. Safflower oil contains almost 80% omega-6. *Researchers are just beginning to discover the dangers of excess omega-6 oils in the diet, whether rancid* or not. Use of these oils should be strictly limited. They should never be consumed after they have been heated, as in cooking, frying or baking. High oleic safflower and sunflower oils, produced from hybrid plants, have a composition similar to olive oil, namely, high amounts of oleic acid and only small amounts

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of polyunsaturated fatty acids and, thus, are more stable than traditional varieties. However, it is difficult to find truly cold-pressed versions of these oils.

Canola Oil contains 5% saturated fat, 57% oleic acid, 23% omega-6 and 10%-15% omega-3. The newest oil on the market, canola oil was developed from the rapeseed, a member of the mustard family. Rapeseed is unsuited to human consumption because it contains a very-long-chain fatty acid called erucic acid, which under some circumstances is associated with fibrotic heart lesions. Canola oil was bred to contain little if any erucic acid and has drawn the attention of nutritionists because of its high oleic acid content. But there are some indications that canola oil presents dangers of its own. It has a high sulphur content and goes rancid easily. Baked goods made with canola oil develop mold very quickly. During the deodorizing process, the omega-3 fatty acids of processed canola oil are transformed into *trans* fatty acids, similar to those in margarine and possibly more dangerous.[1] A recent study indicates that "heart healthy" canola oil actually creates a deficiency of vitamin E, a vitamin required for a healthy cardiovascular system.[2] Other studies indicate that even low-erucic-acid canola oil causes heart lesions, particularly when the diet is low in saturated fat.[3]

Flax Seed Oil contains 9% saturated fatty acids, 18% oleic acid, 16% omega-6 and 57% omega-3. With its extremely high omega-3 content, flax seed oil provides a remedy for the omega-6/omega-3 imbalance so prevalent in America today. Not surprisingly, Scandinavian folklore values flax seed oil as a health food. New extraction and bottling methods have minimized rancidity problems. It should always be kept refrigerated, never heated, and consumed in *small* amounts in salad dressings and spreads.

Tropical Oils are more saturated than other vegetable oils. Palm oil is about 50% saturated, with 41% oleic acid and about 9% omega-6 linoleic acid. Coconut oil is 92% saturated with over two-thirds of the saturated fat in the form of medium-chain fatty acids (often called medium-chain triglycerides). Of particular interest is lauric acid, found in large quantities in both coconut oil and in mother's milk. This fatty acid has strong antifungal and antimicrobial properties. Coconut oil protects tropical populations from bacteria and fungus so prevalent in their food supply; as third-world nations in tropical areas have switched to polyunsaturated vegetable oils, the incidence of intestinal disorders and immune deficiency diseases has increased dramatically. Because coconut oil contains lauric acid, it is often used in baby formulas. Palm kernel oil, used primarily in candy coatings, also contains high levels of lauric acid. These oils are extremely stable and can be kept at room temperature for many months without becoming rancid. Highly saturated tropical oils do not contribute to heart disease but have nourished healthy populations for millennia.[4] Red palm oil has a strong taste that most will find disagreeable—although it is used extensively throughout Africa—but clarified palm oil, which is tasteless and white in color, was formerly used as shortening and in the production of commercial French fries, while coconut oil was used in cookies, crackers and pastries. The saturated fat scare has forced manufacturers to abandon these safe and healthy oils in favor of hydrogenated soybean, corn, canola and cottonseed oils.

For a more complete review of the various fats and oils, please refer to Know Your Fats: The Complete Primer for Understanding the Nutrition of Fats, Oils, and Cholesterol by Mary Enig, PhD, Bethesda Press, 2000, pp. 113-152.

References:

1. Personal communication, Mary G Enig, PhD
2. Sauer, F D, et al, *Nutr Res*, 1997, 17:2:259-269
3. Kramer, J K G, et al, *Lipids*, 1982, 17:372-382; Trenholm, H L, et al, *Can Inst Food Sci Technol J*, 1979, 12:189-193
4. Prior, I, et al, *Am J of Clin Nutr*, 1981, 34:1552

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Appendix II

SATURATED FATS ARE BENEFICIAL, NOT HARMFUL

- Saturated fats (or, more properly, saturated fatty acids) occur in large amounts in animal fats such as butter, lard (pig fat) and beef tallow, and in tropical oils such as coconut oil and palm oil. Fats containing high levels of saturated fatty acids tend to be solid at room temperature.

- Saturated fatty acids are said to cause cancer, heart disease and obesity. Yet these diseases were rare at the turn of the century when consumption of saturated fats was much higher than it is today. The likely culprits for these conditions are polyunsaturated fatty acids and *trans* fats, which came into widespread use after WWII.[1]

- As saturated fats are stable, they do not become rancid easily, do not call upon the body's reserves of antioxidants, do not initiate cancer and do not irritate the artery walls.

- Saturated fats actually play many important roles in the body chemistry. Because they are needed in large amounts, the body makes the saturated fats it needs out of carbohydrates when they are not supplied in sufficient amounts in the diet.[2]

- Vitamins A and D, which are vital for proper growth and for protein and mineral assimilation, are found only in mostly saturated animal fats.

- Saturated fats enhance the immune system, thereby protecting us against infection and cancer.[3]

- Saturated fats help the body lay down calcium in the bones and help prevent osteoporosis.[4]

- Saturated fats provide energy and structural integrity to the cells.[5] At least 50 percent of many, if not most, of the cell membrane must be saturated fat for the cells to work properly.

- Saturated fats protect the liver from alcohol, drugs, pesticides and other poisons.[6]

- Saturated fats enhance the body's use of essential fatty acids, which the body needs in small amounts and obtains from whole foods.[7]

- Stearic acid, found in beef tallow and butter, has cholesterol-lowering properties and is a preferred food for the heart.[8]

- Saturated fats are needed for the kidneys to work properly.[9]

- The lung surfactants are composed of saturated fatty acids.[10] The lungs cannot work without adequate amounts of saturated fats.

References:

1. Uffe Ravnskov, MD, PhD, *The Cholesterol Myths*, NewTrends Publishing, Washington, DC, pp 217-234.
2. Mary G. Enig, PhD, *Know Your Fats*, Bethesda Press, Silver Spring, MD 2000, p 5.
3. J J Kabara, *The Pharmacological Effects of Lipids*, J J Kabara, ed, The American Oil Chemists' Society, Champaign, IL, 1978, 1-14; L A Cohen, et al, *J Natl Cancer Inst*, 1986, 77:43
4. B A Watkins, et al, "Importance of Vitamin E in Bone Formation and in Chrondrocyte Function" Purdue University, Lafayette, IN, *AOCS Proceedings*, 1996; B A Watkins, and M F Seifert, "Food Lipids and Bone

Sample 56 of 72

Health," *Food Lipids and Health*, R E McDonald and D B Min, eds, Marcel Dekker, Inc. New York, NY, p 101
5. J F Mead, et al, *Lipids: Chemistry, Biochemistry and Nutrition, Plenum Press*, 1986, New York
6. A A Nanji, et al, *Gastroenterology*, Aug 1995, 109(2):547-54; Y S Cha, and D S Sachan, *J Am Coll Nutr*, Aug 1994, 13(4):338-43
7. M L Garg, et al, *The FASEB Journal*, 1988, 2:(4):A852; R M Oliart Ros, et al, *Meeting Abstracts, AOCS Proceedings*, May 1998, p 7, Chicago, IL
8. L D Lawson and F Kummerow, "B-Oxidation of the Coenzyme A Esters of Vaccenic, Elaidic and Petroselaidic Acids by Rat Heart Mitochondria," *Lipids*, 1979, 14:501-503
9. Busconi and Denker, Biochum J 1997;328:23
10. Mary G. Enig, PhD, *Know Your Fats*, Bethesda Press, Silver Spring, MD 2000, p 31.

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Appendix III

BENEFITS OF CHOLESTEROL

- Along with saturated fats, cholesterol in the cell membrane gives our cells necessary stiffness and stability. When the diet contains an excess of polyunsaturated fatty acids, these replace saturated fatty acids in the cell membrane, so that the cell walls actually become flabby. When this happens, cholesterol from the blood is "driven" into the tissues to give them structural integrity. This is why serum cholesterol levels may go down temporarily when saturated fats are replaced with polyunsaturated oils in the diet.[1]

- Cholesterol acts as a precursor to vital corticosteroids, hormones that help us deal with stress and protect the body against heart disease and cancer; and to the sex hormones like androgen, testosterone, estrogen and progesterone.

- Cholesterol is a precursor to vitamin D, a very important fat-soluble vitamin needed for healthy bones and nervous system, proper growth, mineral metabolism, muscle tone, insulin production, reproduction and immune system function.

- The bile salts are made from cholesterol. Bile is vital for digestion and assimilation of fats in the diet.

- Research shows that cholesterol acts as an antioxidant.[2] This is the likely explanation for the fact that cholesterol levels go up with age. As an antioxidant, cholesterol protects us against free radical damage that leads to heart disease and cancer.

- Cholesterol is needed for proper function of serotonin receptors in the brain.[3] Serotonin is the body's natural "feel-good" chemical. Low cholesterol levels have been linked to aggressive and violent behavior, depression and suicidal tendencies.

- Mother's milk is especially rich in cholesterol and contains a special enzyme that helps the baby utilize this nutrient. Babies and children need cholesterol-rich foods throughout their growing years to ensure proper development of the brain and nervous system.

- Dietary cholesterol plays an important role in maintaining the health of the intestinal wall.[4] This is why low-cholesterol vegetarian diets can lead to leaky gut syndrome and other intestinal disorders.

References:

1. Jones, P J, *Am J Clin Nutr*, Aug 1997, 66(2):438-46; Julias, A D, et al, *J Nutr*, Dec 1982, 112(12):2240-9
2. Cranton, E M, MD, and J P Frackelton, MD, *Journal of Holistic Medicine*, Spring/Summer 1984, 6-37
3. Engelberg, Hyman, *Lancet*, Mar 21, 1992, 339:727-728; Wood, W G, et al, *Lipids*, Mar 1999, 34(3):225-234
4. Alfin-Slater, R B, and L Aftergood, "Lipids," *Modern Nutrition in Health and Disease*, 6th ed, R S Goodhart and M E Shils, eds, Lea and Febiger, Philadelphia 1980, 134.

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Appendix IV

MODERN METHODS OF PROCESSING FATS

It is important to understand that, of all substances ingested by the body, it is polyunsaturated oils that are most easily rendered dangerous by food processing, especially unstable omega-3 linolenic acid. Consider the following processes inflicted upon naturally occurring fatty acids before they appear on our tables:

Extraction: Oils naturally occurring in fruits, nuts and seeds must first be extracted. In the old days slow-moving stone presses achieved this extraction. But oils processed in large factories are obtained by crushing the oil-bearing seeds and heating them to 230 degrees. The oil is then squeezed out at pressures from 10 to 20 tons per inch, thereby generating more heat. During this process the oils are exposed to damaging light and oxygen. In order to extract the last 10% or so of the oil from crushed seeds, processors treat the pulp with one of a number of solvents—usually hexane. The solvent is then boiled off, although up to 100 parts per million may remain in the oil. Such solvents, themselves toxic, also retain the toxic pesticides adhering to seeds and grains before processing begins.

High-temperature processing causes the weak carbon bonds of unsaturated fatty acids, especially omega 3 linolenic acid, to break apart, thereby creating dangerous free radicals. In addition, antioxidants, such as fat-soluble vitamin E, which protect the body from the ravages of free radicals, are neutralized or destroyed by high temperatures and pressures. BHT and BHA, both suspected of causing cancer and brain damage, are often added to these oils to replace vitamin E and other natural preservatives destroyed by heat.

There is a safe modern technique for extraction that drills into the seeds and extracts the oil and its precious cargo of antioxidants under low temperatures, with minimal exposure to light and oxygen. These expeller-expressed, unrefined oils will remain fresh for a long time if stored in the refrigerator in dark bottles. Crushing olives between stone or steel rollers produces extra virgin olive oil. This process is a gentle one that preserves the integrity of the fatty acids and the numerous natural preservatives in olive oil. If olive oil is packaged in opaque containers, it will retain its freshness and store of antioxidants for many years.

Hydrogenation: This is the process that turns polyunsaturates, normally liquid at room temperature, into fats that are solid at room temperature—margarine and shortening. A French chemist named Sabatier first discovered the technology by which liquid vegetable oils could be hardened to make margarine. He found that a nickel catalyst would cause the hydrogenation—the addition of hydrogen to unsaturated bonds to make them saturated—of ethylene gas to ethane. Subsequently the British chemist Norman developed the first application of hydrogenation to food oils and took out a patent. In 1909, Procter & Gamble acquired the U.S. rights to the British patent that made liquid vegetable oils solid at room temperature. The process was used on both cottonseed oil and lard to give "better physical properties"—to create shortenings that did not melt as easily on hot days.

To produce hydrogenated oils, manufacturers begin with the cheapest oils—soy, corn, cottonseed or canola, already rancid from the extraction process—and mix them with tiny metal particles—usually nickel oxide. The oil with its nickel catalyst is then subjected to hydrogen gas in a high-pressure, high-temperature reactor. Next, soap-like emulsifiers and starch are squeezed into the mixture to give it a better consistency; the oil is yet again subjected to high temperatures when it is steam-cleaned. This removes its unpleasant odor. Margarine's natural color, an unappetizing grey, is removed by bleach. Dyes and strong flavors must then be added to make it resemble butter. Finally, the mixture is compressed and packaged in blocks or tubs and sold as a health food.

Partially hydrogenated margarines and shortenings are even worse for you than the highly refined vegetable oils from which they are made because of chemical changes that occur during the hydrogenation process. Under high temperatures, the nickel catalyst causes the hydrogen atoms to

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change position on the fatty acid chain. Before hydrogenation, pairs of hydrogen atoms occur together on the chain, causing the chain to bend slightly and creating a concentration of electrons at the site of the double bond. This is called the *cis* formation, the configuration most commonly found in nature. With hydrogenation, one hydrogen atom of the pair is moved to the other side so that the molecule straightens. This is called the *trans* formation, rarely found in nature. Most of these man-made *trans* fats are toxic to the body, but unfortunately your digestive system does not recognize them as such. Instead of being eliminated, *trans* fats are incorporated into cell membranes as if they were cis fats—your cells actually become partially hydrogenated. Once in place, *trans* fatty acids with their misplaced hydrogen atoms wreak havoc in cell metabolism because chemical reactions can only take place when electrons in the cell membranes are in certain arrangements or patterns, which the hydrogenation process has disturbed.

In the 1940's, researchers found a strong correlation between cancer and the consumption of fat—the fats used were hydrogenated fats although the results were presented as though the culprit were saturated fats.[1] In fact, until recently saturated fats were usually lumped together with *trans* fats in the various U.S. data bases that researchers use to correlate dietary trends with disease conditions.[2] Thus, natural saturated fats were tarred with the black brush of unnatural hydrogenated vegetable oils.

Altered partially hydrogenated fats made from vegetable oils actually block utilization of essential fatty acids, causing many deleterious effects including sexual dysfunction, increased blood cholesterol and paralysis of the immune system.[3] Consumption of hydrogenated fats is associated with a host of other serious diseases, not only cancer but also atherosclerosis, diabetes, obesity, immune system dysfunction, low-birth-weight babies, birth defects, decreased visual acuity, sterility, difficulty in lactation and problems with bones and tendons.[4] Yet hydrogenated fats continue to be promoted as health foods. The popularity of partially hydrogenated margarine over butter represents a triumph of advertising over common sense. The best defense is to avoid all products with partially hydrogenated vegetable oils.

Homogenization: This is the process whereby the fat particles of cream are strained through tiny pores under great pressure. The resulting fat particles are so small that they stay in suspension rather than rise to the top of the milk. This makes the fat and cholesterol more susceptible to rancidity and oxidation, and some research indicates that homogenized fats may contribute to heart disease.[5]

[Table extracted from Enig, Mary, The Skinny on Fats, Weston A. Price Foundation, http://www.westonaprice.org/know_your_fats/skinny.html, pp. 12-14]

References:

1. Enig, Mary G, PhD, *Nutr Quarterly*, 1993, 17:(4):79-95
2. Enig, Mary G, PhD, *Trans Fatty Acids in the Food Supply: A Comprehensive Report Covering 60 Years of Research*, 2nd Edition, Enig Associates, Inc, Silver Spring, MD, 1995, 148-154; Enig, Mary G, PhD, et al, *J Am Coll Nutr*, 1990, 9:471-86
3. Holman, R T, *Geometrical and Positional Fatty Acid Isomers*, E A Emkin and H J Dutton, eds, 1979, American Oil Chemists' Society, Champaign, IL, 283-302; *Science News Letter*, Feb 1956; Schantz, E J, et al, J Dairy Sci, 1940, 23:181-89.
4. Enig, Mary G, PhD, *Trans Fatty Acids in the Food Supply: A Comprehensive Report Covering 60 Years of Research*, 2nd Edition, Enig Associates, Inc, Silver Spring, MD, 1995; Watkins, B A et al, *Br Pouli Sci*, Dec 1991, 32(5):1109-1119
5. Zikakis, et al, *J Dairy Sci*, 1977, 60:533; Oster, K, *Am J Clin Res*, Apr 1971, Vol II(I)

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Appendix V

ADVERSE EFFECTS OF EXCESS POLYUNSATURATED OILS

- *Polyunsaturated fatty acids occur in small amounts in all foods. Polyunsaturated oils contain large* amounts of polyunsaturated fatty acids. Commercial polyunsaturated oils made from corn, soy, safflower and sunflower seeds are new to human diets. The use of these industrially processed oils is 4 fold higher today than it is was in 1900.[1]

- *Polyunsaturated fatty acids are very fragile. When exposed to heat and oxygen, as during industrial* processing, they form free radicals and other harmful breakdown products that damage the body in many ways.[2]

- Modern processing destroys the vitamins and antioxidants in vegetable oils, but the pesticides are retained. (Seed oils are highly sprayed.)[3]

- Polyunsaturated oils cause the formation of black-brown ceroid pigment deposits, a sign of aging.[4]

- In animal studies, polyunsaturated oil shorten life-span and increase the possibility of atherosclerosis, cancer and other disease.[5]

- Polyunsaturated oils increase the levels of uric acid in the body, a sign of the destruction of protein. An elevated level of uric acid is a heart disease risk factor.[6]

- In animals, consumption of excessive polyunsaturates causes cirrhosis of the liver, similar to that caused by excessive alcohol.[7]

- Many studies have shown that polyunsaturated oils cause cancer.[8]

- Polyunsaturated oils are particularly damaging to the reproductive organs and the lungs.[9]

- Polyunsaturated oils depress learning ability, especially under conditions of stress.[10]

- Polyunsaturated oils given to young animals and impair growth.[11]

- When heated, as in cooking, polyunsaturated oils bond to each other forming polymers, leading to digestive problems (varnish and shellac are polymers).[12]

References:

1. Mary G. Enig, PhD, *Know Your Fats*, Bethesda Press, Silver Spring, MD, 2000, p 94
2. *Proceedings of the National Academy of Sciences*, August 1971.
3. Unpublished research by the Food and Drug Administration, cited in Edward R. Pinckney, MD, *The Cholesterol Controversy*, Sherborne Press, 1973, p 53.
4. Lipid Pigments in Relation to Aging and Dietary Factors," *Pigments in Pathology*, M Wolman, ed., New York, Academic Press, 1969.
5. *Medical Counterpoint*, March 1969.
6. W. Stan Wilson, *The American Journal of Medicine* 51:491; *Lancet* 2:358, February 15, 1969; *Internal Medicine News*, November 15, 1971.
7. *Archives of Pathology*, 82:596, December 1966; *Modern Medicine*, June 14, 1971.
8. "Nutrition in Relation to Cancer," *Advances in Cancer Research*, New York, Academic Press, 1953; "Some thoughts on Food and Cancer," *Nutrition Today*, January, 1972.
9. A. L. Tappel, *Nutrition Today*, December, 1967.
10. *Psychological Reports*, 29:79, 1971
11. *Journal of Nutrition*, 55:577, April 1955; *Journal of the American Oil Chemists' Society*, 33:630, December 1956; *Lipids* 1:254, July 1966.
12. *Journal of Nutrition* , 60:13, September 1956.

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Appendix VI

HEALTH IMPLICATIONS OF FRUCTOSE

1. Fructose has no enzymes, vitamins, and minerals and robs the body of its micronutrient treasures in order to assimilate itself for physiological use.
2. Fructose browns food more readily (Maillard reaction) than with glucose. The Maillard reaction, a browning reaction, happens with any sugar. With fructose it happens seven times faster with than glucose, results in a decrease in protein quality and a toxicity of protein in the body.[1] This is due to the loss of amino acid residues and decreased protein digestibility. Maillard products can inhibit the uptake and metabolism of free amino acids and other nutrients such as zinc and some advanced Maillard products have mutagenic and/or carcinogenic properties. The Maillard reactions between proteins and fructose, glucose, and other sugars may play a role in aging and in some clinical complications of diabetes.[2]
3. Research showed that in subjects that had healthy glucose tolerance and those that had unhealthy glucose tolerance, fructose caused a general increase in both the total serum cholesterol and in the low density lipoproteins (LDL) in most of the subjects.[3] This puts a person at risk for heart disease.
4. Another study showed that the very low-density lipoproteins (VLDL) increased without an apparent change in high-density lipoproteins (HDL). The VLDL and the LDL should be as low as possible and the HDL should be as high as possible.[4]
5. There is a significant increase in the concentration of uric acid that is dependent on the amount of fructose digested. After glucose no significant change occurs. An increase in uric acid can be an indicator of heart disease.[5]
6. Fructose ingestion in humans results in increases in blood lactic acid, especially in patients with preexisting acidotic conditions such as diabetes, postoperative stress, or uremia. The significance to human health is that extreme elevations cause metabolic acidosis and can result in death.[6]
7. Fructose is absorbed primarily in the jejunum and metabolized in the liver. Fructose is converted to fatty acids by the liver at a greater rate than is glucose.[7] When consumed in excess of dietary glucose, the liver cannot convert all of the excess of fructose in the system and it may be malabsorbed. What escapes conversion and being absorbed into the cells may be thrown out in the urine. Diarrhea can be a consequence.[8]
8. Fructose interacts with oral contraceptives and elevates insulin levels in women on "the pill."[9]
9. Fructose reduced the affinity of insulin for its receptor. This is the first step for glucose to enter a cell and be metabolized. As a result, the body needs to pump out more insulin, to handle the same amount of glucose.[10]
10. Fructose consistently produced higher kidney calcium concentrations than did glucose in a study with rats. Fructose generally induced greater urinary concentrations of phosphorus and magnesium and lowered urinary pH compared with glucose.[11] The balance of minerals in the body is very important for the function of vitamins, enzymes and other body function. When the minerals are out of the right relationship, the body chemistry suffers. The presence of diarrhea might be the cause of decreased absorption of minerals.
11. Fructose-fed subjects lose minerals. They had higher fecal excretions of iron and magnesium than did subjects fed sucrose. Apparent iron, magnesium, calcium, and zinc balances tended to be more negative during the fructose feeding period as compared to balances during the sucrose feeding period.[12]
12. A study of 25 patients with functional bowel disease showed that pronounced gastrointestinal distress may be provoked by malabsorption of small amounts of fructose.[13]
13. Many times fructose and sorbitol are substituted for glucose in parenteral nutrition (intervenious feeding, IV). This can have severe consequences with people with hereditary fructose intolerance, a congenital disorder affecting one in 21,000. A European doctor declared: "Fructose and sorbitol containing infusion fluids have no further place in our hospital pharmacies."
14. There is significant evidence that high sucrose diets may alter intracellular metabolism, which in turn facilitates accelerated aging through oxidative damage. Scientists found that the rats given fructose had more undesirable cross-linking changes in the collagen of their skin than in the other

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groups. These changes are also thought to be markers for aging. The scientists say that it is the fructose molecule in the sucrose, not the glucose, which plays the larger problem.[14]

15. Fructose is not metabolized the same as other sugars. Instead of being converted to glucose which the body uses, it is removed by the liver.[15]
16. Because it is metabolized by the liver, fructose does not cause the pancreas to release insulin the way it normally does. Fructose converts to fat more than any other sugar. This may be one of the reasons Americans continue to get fatter. Fructose raises serum triglycerides significantly. As a left-handed sugar, fructose digestion is very low. For complete internal conversion of fructose into glucose and acetates, it must rob ATP energy stores from the liver.[16]
17. Fructose inhibits copper metabolism. A deficiency in copper leads to bone fragility, anemia, defects of the connective tissue, arteries, and bone, infertility, heart arrhythmias, high cholesterol levels, heart attacks, and an inability to control blood sugar levels.[17]

Although these studies were not designed to test the effects of fructose on weight gain, the observation of increased body weight associated with fructose ingestion is of interest. One explanation for this observation could be that fructose ingestion did not increase the production of two hormones, insulin and leptin, that have key roles in the long-term regulation of food intake and energy expenditure.

[Table developed by Nancy Appleton, Ph.D., clinical nutritionist, researcher, lecturer, and author of *Lick the Sugar Habit, Healthy Bones, Heal Yourself With Natural Foods and the Curse Of Louis Pasteur and Lick the Sugar Habit Sugar Counter*]

References:

1. H. F. Bunn and P. J. Higgins, "Reaction of Nonosaccharides with Proteins; Possible Evolutionary Significance." SCIENCE 213 (1981):2222-2244.
2. William L Dills Jr., "Protein Fructosylation: Fructose and the Maillard Reaction," AMERICAN JOURNAL OF CLINICAL NUTRITION 58 (suppl) (1993): 779S-787S.
3. J. Hallfrisch et al., "The Effects of Fructose on Blood Lipid Levels," AMERICAN JOURNAL OF CLINICAL NUTRITION 37, no. 3 (1983): 740-748.
4. Claire B. Hollenbeck, "Dietary Fructose Effects on Lipoprotein Metabolism and Risk for Coronary Artery Disease," AMERICAN JOURNAL OF CLINICAL NUTRITION 58 (suppl), (1993): 800S-807S.
5. J. MacDonald, Anne Keyser, and Deborah Pacy, "Some Effects, in Man, of Varying the Load of Glucose, Sucrose, Fructose, or Sorbitol on Various Metabolites in Blood," AMERICAN JOURNAL OF CLINICAL NUTRITION 31 (August 1978)): 1305-1311.
6. Hallfrisch, 1990.
7. D. Zakim and R. H. Herman, "Fructose Metabolism II," AMERICAN JOURNAL OF CLINICAL NUTRITION 21: 315-319, 1968.
8. A. E. Bender and K. B. Damji, "Some Effects of Dietary Sucrose," WORLD REVIEW OF NUTRITION AND DIETETICS 15 (1972): 104-155.
9. Hunter,Beatrice Trum,"Confusing Consumers About Sugar Intake," CONSUMERS' RESEARCH 78, no 1 (January 1995): 14-17.
10. Hunter.
11. A. E. Bergstra, A. G. Lemmens, and A. C. Beynens, "Dietary Fructose vs. Glucose Stimulates Nephrocalcinogenesis in Female Rats," JOURNAL OF NUTRITION 123, no. 7 (July 1993): 1320-1327.
12. R. Ivaturi and C. Kies, "Mineral Balances in Humans as Affected by Fructose, High Fructose Corn Syrup and Sucrose," PLANT FOODS FOR HUMAN NUTRITION 42, no. 2 (1992): 143-151.
13. J. J. Rumessen and E. Gudmand-Hoyer, "Functional Bowel Disease: Malabsorption and Abdominal Distress After Ingestion of Fructose, Sorbitol, and Fructose-Sorbitol Mixtures," GASTROENTEROLOGY 95, no. 3 (September 1988): 694-700.

Sheila 63 of 72

14. Mc Donald, Roger B., "Influence of Dietary Sucrose on Biological Aging," AMERICAN JOURNAL OF CLINICAL NUTRITION 62 (suppl), (1995): 284s-293s.
15. www.NutritionNewsFocus.com, May 25, 2000.
16. H. Hallfrisch, et al ,The Effects of Fructose on Blood Lipid Levels, AMERICAN JOURNAL OF CLINICAL NUTRITION, 37: 5, 1983, 740-748.
17. Klevay, Leslie, acting director of the U.S. Agriculture Department's Human Nutrition Research Center, Grand Forks, N.D.

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Appendix VII

NAMES OF INGREDIENTS THAT CONTAIN ENOUGH MONOSODIUM GLUTAMATE (MSG) TO SERVE AS COMMON MSG-REACTION TRIGGERS

These ALWAYS contain MSG

Glutamate
Calcium Caseinate
Monopotassium Glutamate
Hydrolyzed Protein (any protein that is hydrolyzed) including Hydrolyzed Vegetable Protein and Hydrolyzed Plant Protein
Glutamic Acid
Textured Protein (Including TVP)
Yeast Extract
Gelatin
Yeast Nutrient
Yeast Food
Hydrolyzed Corn Gluten
Monosodium Glutamate
Sodium Caseinate
Autolyzed Yeast

These OFTEN contain MSG or create MSG during processing

Carrageenan
Natural Pork Flavoring
Commercial Bouillon and Broth
Natural Beef or Chicken Flavoring
Commercial Stock
Whey Protein Concentrate
Whey Protein
Whey Protein Isolate
Flavor(s) and Flavoring(s)
Natural Flavor(s) and Flavoring(s)
Maltodextin
Citric Acid
Ultra-pasteurized
Barley Malt
Pectin
Protease
Protease Enzymes of various sources can release excitotoxin amino acids from food proteins
Anything Enzyme Modified
Enzymes anything

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Malt Extract
Malt Flavoring
Soy Protein Concentrate
Soy Protein Isolate
Soy Sauce
Soy Sauce Extract
Soy Protein
Anything Protein Modified
Seasonings and Spices

Other Sources of MSG

Reduced Fat Milks
Non-organic Fruits and Vegetables (sprayed with a growth enhancer containing MSG)
Microwaved Foods

Source: Samuels, Jack, "MSG Update: The Obesity Epidemic – Should We Believe What we Read and Hear?," *Wise Traditions*, Weston A . Price Foundation, vol 5, no. 2, Summer 2004, p. 38.

Sinda 66 of 72

REFERENCES

[1] U.S. Department of Health and Human Services. The Surgeon General's call to action to prevent and decrease overweight and obesity. Rockville, MD, U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General, 2001.

[2] Weir, C. Edith, "An Evaluation of Research in the United States on Human Nutrition, Report No. 2, Benefits from Nutrition Research," Human Nutrition Research Division, Agricultural Research Service, U. S. Department of Agriculture, August 1971.

[3] U. S. Department of Health and Human Service, Public Health Service. The Surgeon General's Report on Nutrition and Health. DHES (PHS) Publication No. 88-50215, 1988.

[4] Drexler, Madeline, U.S. Needs a Tighter Lid on Imported Food, Newsday, December 2, 2003, p. A33.

[5] Schlosser, Eric, "Why McDonald's Fries Taste So Good," The Atlantic Monthly; January 2001, 01.01; Volume 287, No. 1; pp. 50-56 .

[6] Ray, Mitra, PhD, *From Here to Longevity: Your Complete Guide for a Long and Healthy Life*, Shining Star Publishing, Seattle, 2002, pp. 193-194.

[7] Ravnskov, Uffe, MD, PhD, *The Cholesterol Myths: Exposing the Fallacy that Saturated Fats and Cholesterol Cause Heart Disease*, New Trends Publishing, 2000. See also Enig, Mary, The Skinny on Fats, Weston A. Price Foundation, p. 2.

[8] Derived from Soros, George, "The Bubble of American Supremacy," The Atlantic Monthly, December 2003, p. 65.

[9] Ravnskov, Uffe, *The Cholesterol Myths: Exposing the Fallacy that Saturated Fats and Cholesterol Cause Heart Disease*.

[10] Enig, Mary, PhD, Low Fat Diets, Weston A. Price Foundation, http://www.westonaprice.org/know_your_fats/lowfatdiets.html, p.1.

[11] Seidell JC. Dietary fat and obesity: an epidemiologic perspective. Am J Clin Nutr 1998 Mar;67(3 Suppl):546S-550S.

[12] Rabast U, Schonborn J, Kasper H. Dietetic treatment of obesity with low and high-carbohydrate diets: comparative studies and clinical results. Int J Obes 1979;3(3):201-11.

[13] Golay A, Eigenheer C, Morel Y, Kujawski P, Lehmann T, de Tonnac N. Weight-loss with low or high carbohydrate diet? Int J Obes Relat Metab Disord 1996 Dec;20(12):1067-72.

[14] Meckling KA, Gauthier M, Grubb R, Sanford J. Effects of a hypocaloric, low-carbohydrate diet on weight loss, blood lipids, blood pressure, glucose tolerance, and body composition in free-living ovaerweight women. Can J Physiol Pharmacol. 2002;80:1095-1105.

[15] Pawlak DB, Ebbeling CB, Ludwig DS. Should obese patients be counselled to follow a low-glycaemic index diet? Yes. Obaes Rev. 2002;3:235-234.

[16] Volek JS, Westman EC. Very-low-carbohydrate weight-loss diets revisited. Cleve Clin J Med. 2002;69:849,853,856-858.

[17] Westman EC, Mavropoulos J, Yancy WS, Volek JS. A review of low-carbohydrate ketogenic diets. Curr Atheroscler Rep. 2003;5:476-483.

[18] Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, Ludwig DS. A reduced-glycemic load diet in the treatment of adolescent obesity. Arch Pediatr Adolesc Med. 2003;157:773-779.

[19] Hays JH, DiSabatino A, Gorman RT, Vincent S, Stillabower ME, Effect of a high saturated fat and no-starch diet on serum lipid subfractions in patients with documented atherosclerotic cardiovascular disease, Mayo Clin Proc. 2003 Nov; 78(11):1329-30.

[20] Ebbeling, Cara PhD, Leidig, Michael, et al, "A Reduced-Glycemic Load Diet in the Treatment of Adolescent Obesity," Archives of Pediatric Adolescent Medicine, vol. 157, Aug, 2003, pp. 773-779.

[21] Smith, MM, and F. Lifshitz, Pediatrics, Mar 1994, 93:3:438-443.

[22] Dreon, MD et al, American Journal of Clinical Nutrition 2000;71:1611-1616.

[23] Enig, Low Fat Diets, p. 1.

[24] Enig, Mary, PhD, *The Skinny on Fats*, Weston A. Price Foundation, www.westonaprice.org/know_your_fats/skinny3.html.

[25] Enig, *Skinny on Fats*.

[26] Enig, *Skinny on Fats*.

[27] Enig, Mary, PhD, *Know Your Fats: The Complete Primer for Understanding the Nutrition of Fats, Oils and Cholesterol*, Bethesda Press, Silver Spring, MD, 2000, p. 88.

[28] Matesz, Don, "Choose Your Fats Wisely!: How Eating Good Fats *Promotes* Health," Well Being Journal, Vol 13, No. 1, January/February 2004, p. 4.
[29] Marieb, EN, *Human Anatomy and Physiology*, fifth edition, (Benjamin Cummings, 2001), p. 983.
[30] Bettelheim FA, Brown WH, March J, *Introduction to General Organic and Biochemistry*, sixth edition, (Brooks/Cole, 2001), p. 482. Also, Enig, Mary, *Know Your Fats*, p. 270.
[31] Abrams HL, "The Preference for Animal Protein and Fat: A Cross-Cultural Survey," in Harris M and Ross EB, eds., Food and Evolution (Philadelphia PA, Temple University Press, 1987), p. 207.
[32] Enig, Mary G, PhD, *Trans Fatty Acids in the Food Supply: A Comprehensive Report Covering 60 Years of Research*, 2nd Edition, Bethesda Press, 1995, pp. 5-8.
[33] Watkins, B A, et al, "Importance of Vitamin E in Bone Formation and in Chrondrocyte Function" Purdue University, Lafayette, IN, *AOCS Proceedings*, 1996; Watkins, B A, and M F Seifert, "Food Lipids and Bone Health," *Food Lipids and Health*, R E McDonald and D B Min, eds, p 101, Marcel Dekker, Inc, New York, NY, 1996.
[34] Dahlen, G H, et al, *J Intern Med*, Nov 1998, 244(5):417-24; Khosla, P, and K C Hayes, *J Am Coll Nutr*, 1996, 15:325-339; Clevidence, B A, et al, *Arterioscler Thromb Vasc Biol*, 1997, 17:1657-1661.
[35] Nanji, A A, et al, *Gastroenterology*, Aug 1995, 109(2):547-54; Cha, Y S, and D S Sachan, *J Am Coll Nutr*, Aug 1994, 13(4):338-43; Hargrove, H L, et al, *FASEB Journal*, Meeting Abstracts, Mar 1999, #204.1, p A222.
[36] Kabara, J J, *The Pharmacological Effects of Lipids*, The American Oil Chemists Society, Champaign, IL, 1978, 1-14; Cohen, L A, et al, *J Natl Cancer Inst*, 1986, 77:43.
[37] Garg, M L, et al, *FASEB Journal*, 1988, 2:4:A852; Oliart Ros, R M, et al, "Meeting Abstracts," AOCS Proceedings, May 1998, 7, Chicago, IL.
[38] Lawson, L D and F Kummerow, *Lipids*, 1979, 14:501-503; Garg, M L, *Lipids*, Apr 1989, 24(4):334-9.
[39] Ravnskov, U, *J Clin Epidemiol*, Jun 1998, 51:(6):443-460. See also http://home2.swipnet.se/~w-25775/.
[40] Felton, C V, et al, *Lancet*, 1994, 344:1195.
[41] Ravnskov, Uffe, MD, PhD, *The Cholesterol Myths*. See also Mary Enig, The Skinny on Fats, pp. 3-5.
[42] Addis, Paul, *Food and Nutrition News*, March/April 1990, 62:2:7-10.
[43] R B Alfin-Slater, and L Aftergood, "Lipids," *Modern Nutrition in Health and Disease*, 6th ed, 1980, R S Goodhart and M E Shils, eds, Lea and Febiger, Philadelphia, p 134.
[44] Enig, Mary and Sally Fallon, *Oiling of America*, Weston A. Price Foundation, http://www.westonaprice.org/know_your_fats/oiling.html, p. 25.
[45] Barnes, Broda, and L Galton, *Hyprthyroidism, The Unsuspected Illness*, 1976, T Y Crowell, New York, NY.
[46] Castelli, William, *Arch Int Med*, Jul 1992, 152:7:1371-1372.
[47] Hubert H, et al, *Circulation*, 1983, 67:968; Smith, R and E R Pinckney, *Diet, Blood Cholesterol and Coronary Heart Disease: A Critical Review of the Literature*, Vol 2, 1991, Vector Enterprises, Sherman Oaks, CA.
[48] M Gurr, "A Fresh Look at Dietary Recommendations," *Inform*, April 1996, 7:4:432-435.
[49] Enig, Know Your Fats, p 94.
[50] Enig, Mary PhD, *Trans* Fatty Acids in the Food Supply: A Comprehensive Report Covering 60 Years of Research, 2nd Edition, 1995, Enig Associates, Inc., Silver Spring, MD, pp 4-8.
[51] Proceedings of the National Academy of Sciences, August 1971.
[52] Unpublished research by the Food and Drug Administration, cited in Edward R. Pinckney, MD, *The Cholesterol Controversy*, Sherborne Press, 1973, p 53.
[53] Enig and Faloon, *Oiling of America*, pp. 22-24.
[54] Lipid Pigments in Relation to Aging and Dietary Factors," *Pigments in Pathology*, M Wolman, ed., New York, Academic Press, 1969.
[55] *Medical Counterpoint*, March, 1969.
[56] W. Stan Wilson, *The American Journal of Medicine* 51:491; *Lancet* 2:358, February 15, 1969; *Internal Medicine News*, November 15, 1971.
[57] *Archives of Pathology*, 82:596, December, 1966; *Modern Medicine*, June 14, 1971.
[58] "Nutrition in Relation to Cancer," *Advances in Cancer Research*, New York, Academic Press, 1953; "Some thoughts on Food and Cancer," *Nutrition Today*, January, 1972.
[59] A. L. Tappel, *Nutrition Today*, December, 1967.
[60] Psychological Reports, 29:79, 1971.

Sonda 68 of 72

[61] Journal of Nutrition, 55:577, April 1955; Journal of the American Oil Chemists' Society, 33:630, December 1956; Lipids 1:254, July, 1966.
[62] *Journal of Nutrition* , 60:13, September, 1956.
[63] A general review of citations for problems with polyunsaturate consumption is found in E R Pinckney, and C Pinckney, *The Cholesterol Controversy*, 1973, Sherbourne Press, Los Angeles, pp 127-131.
[64] Enig, Know Your Fats, pp. 38-39.
[65] Chin et al, Dietary Sources of conjugated Linoleic Isomers of Linoleic Acid, a Newly recognized Class of Anticarcinogens, Journal of Food Composition and Analysis, 1992, 5:185-197.
[66] Enig, *Oiling of America*, p. 6.
[67] Enig, *Know Your Fats*, p. 85.
[68] Enig, *Oiling of America*, p. 21.
[69] Researchers at the University of Florida at Gainsborough found trans levels as high as 4.6% in processed canola oil. (S. O'Keefe and others. Journal of Food Lipids1994;1:165-176.) The conversion of omega-3 fatty acids to trans fats can be prevented by certain careful processing methods. (JL Sebedio and others. European Journal of Clinical Nutrition 2000 Feb;54(2):104-13
[70] Enig, Know Your Fats, p. 44.
[71] Enig, Know Your Fats, pp. 38-45.
[72] Food Labeling; Trans Fatty Acids in Nutrition Labeling; Consumer Research to Consider Nutrient Content and Health Claims and Possible Footnote or Disclosure Statements; Final Rule and Proposed Rule, Food and Drug Administration, Federal Register: July 11, 2003, volume 68, Number 133, pp 41433-41506. See also U.S. Office of Management and Budget, Letter to the Department of Health and Human Services regarding trans fatty acids, September 18, 2001.
[73] Food Chemical News, "IOM Advises Condensed daily Value for Saturated and Trans Fatty Acids," Vol. 45, No. 45, December 22, 2003.
[74] Kinsella, John E, *Food Technology*, October 1988, 134 ; Lasserre, M, et al, Lipids, 1985, 20:4:227.
[75] Horrobin, D F, *Reviews in Pure and Applied Pharmacological Sciences*, Vol 4, 1983, Freund Publishing House, 339-383; Devlin, T M, ed, *Textbook of Biochemistry*, 2nd Ed, 1982, Wiley Medical, 429-430; Fallon, Sally, and Mary G Enig, PhD, "Tripping Lightly Down the Prostaglandin Pathways," *Price-Pottenger Nutrition Foundation Health Journal*, 1996, 20:3:5-8.
[76] Okuyama, H, et al, *Prog Lipid Res*, 1997, 35:4:409-457.
[77] Simopoulos, A P, and Norman Salem, *Am J Clin Nutr*, 1992, 55:411-4.
[78] Ray, Mitra, *From Here to Longevity*, pp. 229-230.
[79] Lasserre, M, et al, *Lipids*, 1985, 20:4:227.
[80] Ray, Mitra, *From Here to Longevity*, p.230.
[81] U.S. Office of Management and Budget, Letter to the Department of Agriculture and the Department of Health and Human Services regarding dietary guidelines, May 27, 2003.
[82] Sullivan, J L, *The Lancet*, June 13, 1981, 1239; Gutteridge, J M, et al, *Biochemical Journal*, 1982, 206:605-9.
[83] Reinhold, John G, *Ecology of Food and Nutrition*, 1972, I:187-192; Reddy, N R, et al, *Phytates in Cereals and Legumes*, 1989, CRC Press, Boca Raton, FL.
[84] Aubert, Claude, *Les Aliments Fermentés Traditionnels. Une Richesse Meconnue,* 1985, Terre Vivante, Mens, France, 35; Steinkraus, Keith H, ed, *Handbook of Indigenous Fermented Foods*, 1983, Marcel Dekker, Inc, New York, NY.
[85] Stitt, Paul, *Fighting the Food Giants*, 1981, Natural Press, Manitowoc, WI, 62.
[86] Jenkins, David J A, et al, *American Journal of Clinical Nutrition*, March 1981, 34:362-366.
[87] Fallon, Sally and Mary Enig, Nourishing Traditions, New Trends Publishing, Washington DC, 2001, p. 23.
[88] Beasley, Joseph D, MD, and Jerry J Swift, MA, *The Kellogg Report*, 1989, The Institute of Health Policy and Practice, Annandale-on-Hudson, NY, 144-145.
[89] Paton, J, *British Medical Journal*, 1933, 1:738.
[90] Howell, Edward, MD, *Enzyme Nutrition*, 1985, Avery Publishing, Wayne, NJ, 88, 104; Fields, M, *Proc Soc Exp Biol Med*, 1984, 175:530-537.
[91] Douglas, W C, MD, *Second Opinion*, Atlanta, GA, May 1995, Vol V, No 5.

Sources 69 of 72

[92] Yudkin, J, *The Lancet*, 1957, 11:155-62; Yudkin, J, et al, *Annals of Nutrition and Metabolism*, 1986, 30:4:261-66; Yudkin, J, et al, *Sugar: Chemical, Biological and Nutritional Aspects of Sucrose*, 1971, Daniel Davey, Hartford, CT.
[93] Lopez, A, American Journal of Clinical Nutrition, 1966, 18:149-153.
[94] Page, Melvin, DDS, *Degeneration, Regeneration*, 1949, Price-Pottenger Nutrition Foundation, San Diego, CA.
[95] Howell, Edward, MD, *Enzyme Nutrition*, 1985, Avery Publishing, Wayne, NJ, 88, 104.
[96] Beasley, Joseph D, MD, and Jerry J Swift, MA, *The Kellogg Report*, 1989, The Institute of Health Policy and Practice, Annandale-on-Hudson, NY, p. 132; Yudkin, John, Dr, *Sweet & Dangerous*, 1973, Bantam Books, New York, NY.
[97] Beasley, Joseph D, MD, and Jerry J Swift, MA, *The Kellogg Report*, 1989, p.129.
[98] Fields, M, Proceedings of the Society of Experimental Biology and Medicine, 1984, 175:530-537.
[99] Fields, M, Proceedings of the Society of Experimental Biology and Medicine, 1984, 175:530-537.
[100] Appleton, Nancy, PhD, Fructose is No Answer For a Sweetener, http://www.mercola.com/2002/jan/5/fructose.htm.
[101] Hunter, Beatrice Trum, Confusing Consumers About Sugar Intake, *Consumer's Research* 78, no 1 (January 1995): 14-17.
[102] Fallon, Sally and Mary Enig, *Nourishing Traditions*, New Trends Publishing, Washington DC, 2001, p. 23.
[103] Hallfrisch, Judith, Metabolic Effects of Dietary Fructose, *FASEB Journal* 4 (June 1990): 2652-2660.
[104] *American Journal of Clinical Nutrition*, November 2002 Vol. 76, No. 5, 911-922.
[105] Appleton, Nancy Ph.D., Fructose is No Answer For a Sweetener, http://www.mercola.com/2002/jan/5/fructose.htm.
[106] http://www.mcvitamins.com/cornsyrup.htm.
[107] Bunn, HF, and P. J. Higgins, Reaction of Nonosaccharides with Proteins; Possible Evolutionary Significance, *Science* 213 (1981):2222-2244.
[108] Dills, William L, Jr., Protein Fructosylation: Fructose and the Maillard Reaction, *American Journal of Clinical Nutrition* 58 (suppl) (1993): 779S-787S.
[109] Hunter, Confusing Consumers About Sugar Intake, pp. 14-17.
[110] MacDonald, J, Anne Keyser, and Deborah Pacy, Some Effects, in Man, of Varying the Load of Glucose, Sucrose, Fructose, or Sorbitol on Various Metabolites in Blood, *American Journal of Clinical Nutrition* 31 (August 1978)): 1305-1311.
[111] Hallfrisch, Judith, Metabolic Effects of Dietary Fructose, *FASEB Journal* 4 (June 1990): 2652-2660.
[112] Zakim, D. and R. H. Herman, Fructose Metabolism II, *American Journal of Clinical Nutrition* 21: 315-319, 1968.
[113] Bender, A. E., and K. B. Damji, "Some Effects of Dietary Sucrose," *World Review of Nutrition and Dietitics* 15 (1972): 104-155.
[114] Rumessen, J.J., Gudmand-Hoyer, "Functional Bowel Disease: Malabsorption and Abdominal Distress After Ingestion of Fructose, Sorbitol, and Fructose-Sorbitol Mixtures," *Gastroenterology* 95, no. 3 (September 1988): 694-700.
[115] Hunter,Beatrice Trum,"Confusing Consumers About Sugar Intake," *Consumers' Research* 78, no 1 (January 1995): 14-17.
[116] Bergstra, A. E., Lemmens, and A. C. Beynens, Dietary Fructose vs. Glucose Stimulates Nephrocalcinogenesis in Female Rats, *Journal of Nutrition* 123, no. 7 (July 1993): 1320-1327.
[117] Ivaturi, R. and C. Kies, Mineral Balances in Humans as Affected by Fructose, High Fructose Corn Syrup and Sucrose, *Plant Foods for Human Nutrition* 42, no. 2 (1992): 143-151.
[118] McDonald, Roger B., Influence of Dietary Sucrose on Biological Aging, *American Journal of Clinical Nutrition* 62 (suppl), (1995): 284s-293s.
[119] Hallfrisch, H. et al., The Effects of Fructose on Blood Lipid Levels, *American Journal of Clinical Nutrition*, 37: 5, 1983, 740-748.
[120] Klevay, Leslie, Acting Director of the U.S. Agriculture Department's Human Nutrition Research Center, Grand Forks, N.D.
[121] Observation by Nancy Appleton, PhD.

Sandra 70 of 72

[122] Hollenbeck, Claire B., Dietary Fructose Effects on Lipoprotein Metabolism and Risk for Coronary Artery Disease, *American Journal of Clinical Nutrition* 58 (suppl), (1993): 800S-807S.
[123] Appleton, Nancy Ph.D., Fructose is No Answer For a Sweetener, http://www.mercola.com/2002/jan/5/fructose.htm.
[124] Waldholz, Michael, *Wall Street Journal*, February 20, 2003.
[125] Enig, Know Your Fats, p. 52.
[126] Joint WHO/FAO Expert Consultation, WHO Technical Repost Series 916, Diet, Nutrition and the Prevention of Chronic Disease, April 23, 2003.
[127] Food and Nutrition Board, Institute of Medicine, Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients) (2002).
[128] Abrams, H Leon, *Journal of Applied Nutrition*, 1980, 32:2:70-71.
[129] Cheraskin, E; et al, *Journal of Orthomolecular Psychiatry*, 1978, 7:150-155.
[130] Spencer, H, et al, *Federation Proceedings*, Nov 1986, 45:12:2758-2762 ; Spencer, H and L Kramer, *American Journal of Clinical Nutrition*, June 1983, 37:6:924-929; Fallon, Sally, and Mary G Enig, PhD, "Dem Bones—Do High Protein Diets Cause Bone Loss?" *Price-Pottenger Nutrition Foundation Health Journal*, 1996, 20:2:1-4, also posted at www.westonaprice.org.
[131] Webb, J G, et al, *Canadian Medical Association Journal*, Oct 1, 1986, 135:7:753-8.
[132] Fallon, Sally, "Vitamin A Vagary," *Price-Pottenger Nutrition Foundation Health Journal*, 1995, 19:2:1-3, also posted at www.westonaprice.org; Jennings, I W, *Vitamins in Endocrine Metabolism*, 1970, Heineman, London, UK.
[133] *Nutrition Reviews*, 1979, 37:142-144.
[134] Specker, B L, et al, *American Journal of Clinical Nutrition* 1988, 47:89-92; Berg H van den, et al, *The Lancet*, 1988, 1:242-3; Herbert, V, *American Journal of Clinical Nutrition*, 1987, 46:387-402; Murray, M T, *American Journal of Natural Medicine*, April 1996, 3:(3):10-15; Ensminger, A H, et al, *Encyclopedia of Foods & Nutrition*, 1994, CRC Press, Boca Raton, FL, 1284.
[135] A good example is the Haenszel, et al study of Japanese American men which showed a correlation with consumption of beef and colon cancer, but stronger correlations with consumption of macaroni, green beans and peas. Extensive press coverage emphasized the connection of beef and colon cancer but ignored the stronger correlation with other Western foods. The study used the questionable technique of dietary recall and did not have matched controls. Haenszel, W, et al, *Journal of the National Cancer Institute*, Dec 5, 1973, 51(6):1765-79.
[136] Enig, Mary G, PhD, *Townsend Letter for Doctors*, December 1993, 1214-1215.
[137] Lopez, A, American Journal of Clinical Nutrition, 1996, 18:149.
[138] Merrill, Alfred J, et al, Annual Reviews of Nutrition, 1993, 13:539-559.
[139] Wallace, G M, Journal of the Science of Food and Agriculture, Oct 1971, 22:526-35.
[140] Rackis, J J, et al, Qualitative Plant Foods in Human Nutrition, 1985, 35:225
[141] Rackis, J J, et al, Qualitative Plant Foods in Human Nutrition, 1985, 35:232; Fallon, Sally, and Mary G Enig, PhD, "Soy Products for Dairy Products - Not So Fast," Health Freedom News, Sept 1995, 12-20; Fallon, Sally and Mary G Enig, PhD, The Ploy of Soy, Price-Pottenger Nutrition Foundation, San Diego, CA. See also Soy Alert! at www.westonaprice.org.
[142] Fallon, Sally, and Mary G Enig, PhD, "Dem Bones—Do High Protein Diets Cause Bone Loss?" Price-Pottenger Nutrition Foundation Health Journal, 1996, 20:2:1-4, also posted at www.westonaprice.org.
[143] Fallon, Sally, "Vitamin A Vagary," Price-Pottenger Nutrition Foundation Health Journal, 1995, 19:2:1-3, also posted at www.westonaprice.org; Jennings, I W, Vitamins in Endocrine Metabolism, 1970, Heineman, London, UK.
[144] Blaylock, Russell MD, Excitotoxins, Neurodegeneration and Neurodevelopment, http://www.dorway.com/blayenn.html#10.
[145] Olney JW. Glutamate: a neurotoxic transmitter. J Child Neurol 4: 218-226, 1989.
[146] Blaylock
[147] Ikonomidou C and Turski L, Glutamate in Neurodegenerative Disorders, In, Stone TW (Ed), Neurotransmitters and Neuromodulators: Glutamate, CRC Press, Boca Raton, 1995, 253-272.
[148] Blaylock
[149] Samuels, Adrienne, PhD, Monosodium Glutamate (MSG), monograph, September 1995.
[150] *Ibid*

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[151] Schaumburg, H.H., Byck, R., Gerstl, R., and Mashman, J.H., Monosodium L-glutamate: its pharmacology and role in the Chinese restaurant syndrome. Science 163: 826-828, 1969.
[152] Lucas, DR and Newhouse, JP. The toxic effect of sodium-L-glutamate on the inner layers of the retina. *AMA Arch Opthalmof.* 58: 193-201, 1957.
[153] *Stedman's Online Medical Dictionary, 27th Edition*, (www.onelook.com)
[154] Olney JW. Brain lesions, obesity, and other disturbances in mice treated with monosodium glutamate. *Science*. 164(880):719-21, May 9, 1969.
[155] Burbach JA, Schlenker EH, Goldman M. Characterization of muscles from aspartic acid obese rats. *Am J Physiol*. 249(1 Pt 2):R106-10, July, 1985.
[156] Schainker B, Olney JW. Glutamate-type hypothalamic-pituitary syndrome in mice treated with aspartate or cysteate in infancy. *J Neural Transm*. 35(3):207-15, 1974.
[157] Olney, JW and Ho, OL. Brain damage in infant mice following oral intake of glutamate, aspartate, or cysteine. *Nature (Lond)*. 227: 609-611, 1970.
[158] Olney, JW and Sharpe, LG. Brain lesions in an infant rhesus monkey treated with monosodium glutamate. *Science*. 166:386-388, 1969.
[159] Olney, JW, Sharpe, LG, and Feigin, RD. Glutamate-induced brain damage in infant primates. *J Neuropath Exp Neurol*. 31: 464-488, 1972.
[160] Stegink, LD, Reynolds, WA, Filer, LJ Jr., Baker, GL, and Daabees, T. Comparative metabolism of glutamate in the mouse, monkey and man. In *Advances in Biochemistry and Physiology*. Edited by Filer, LJ Jr., Garatttini, S, Kare,MR, Reynods, WA, and Wurtman, RJ. New York: Raven Press, 85-102, 1979.
[161] Himwhich, WA, Peterson, IM, and Graves, IP. Ingested glutamate plasma levels of glutamic acid. *J Appl Physiol*. 7: 196-201, 1954.
[162] Bouret, SG and Simerly, RD. Minireview: leptin and development of hypothalamic feeding circuits. *Endocrinology*. 145 (6), 2621-2626, June, 2004.
[163] Bouret, SG, Draper, SJ, and Simley, RB. Trophic action of leptin on hypothalamus neurons that regulate feeding. *Science*. 2; 304 (5667), 108-110, April, 2, 2004.
[164] Small, CJ, Stanley, SA, and Bloom, SR. appetite control and reproduction: leptin and beyond. *Semin Reprod Med*. 20 (4): 389-398, Nov 2002.
[165] Dadoun, F. Food intake: who controls what? *Ann Endocrinol (Paris)*. 63 (6 Pt 2): S15- S24, Dec, 2002.
[166] Simon, E and Barrio, AS. Leptin and obesity. *An Sist Sanit Navar*. 25 Suppl 1: 53-64, 2002 -Translated from Spanish.
[167] Bjorbaek, C and Kahn, BB. Leptin signaling in the central nervous system and periphery. *Recent Prog Horm Res*. 59: 305-331, 200.
[168] Blaylock, Russell L, MD. *Excitotoxins: The Taste that Kills*. Health Press, Santa Fe, NM, 1996.
[169] Brightman, MN and Broadwell, BD. The morphological approach to the study of normal and abnormal brain permeability. *Adv Exptl Med Biol* 69. 41, 1976.
[170] Weindel, A. Neuroendocrine aspects of circumventricular organs. In *Frontiers in Neuroendocrinology*, edited by Maretini, L and Ganong, WF, London: Oxford University Press, 1-32, 1973.
[171] Broadwell, RD and Sofroniew, MV. Serum proteins bypass the blood-brain fluid barriers for extracellular entry to the central nervous system. *Exp neurol*. 120: 245-263. 1993.
[172] Blaylock, *Excitotoxins: The Taste that Kills*.
[173] Nemeroff, CB and Crisley, FD. Monosodium L-glutamate induced convulsions: temporary alteration in blood-brain barrier permeability to plasma proteins. *Environ Physiol Biochem* 5: 389-395, 1975.
[174] Toth, E and Lajtha. A. *Neurochem Res*. 6: 1309- 1317, 1981.
[175] Yu T, Zhao Y, Shi W, Ma R, and Yu L. Effects of maternal oral administration of monosodium glutamate at a late stage of pregnancy on developing mouse fetal brain. *Brain Res*. 747(2):195-206, Feb 7, 1997.
[176] Gao J, Wu J, Zhao XN, Zhang WN, Zhang YY, and Zhang ZX. Transplacental neurotoxic effects of monosodium glutamate on structures and functions of specific brain areas of filial mice. *Sheng Li Xue Bao*. 46(1): 44-51, Feb 1994. Translated from Chinese.
[177] Frieder, B and Grimm, VE. Prenatal monosodium glutamate (MSG) treatment given through the mother's diet causes behavioral deficits in rat offspring. *Intern J Neurosci*. 23: 117-126, 1984.
[178] Truth in Labeling Campaign.
(www.truthinlabeling.org/Mercury&MSGinVaccines.html).

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[179] Aschner M, Yao CP, Allen JW, Tan KH. Methylmercury alters glutamate transport in astrocytes. *Neurochem Int.* 2000 Aug-Sep;37(2-3):199-206. Review.
[180] Truth in Labeling Campaign. (www.truthinlabeling.org/formulacopy.html)
[181] Truth in Labeling Campaign. (www.truthinlabeling.org/manufac.html).
[182] Samuels, Jack, *"The Obesity Epidemic: Should We Believe What We Read And Hear,"* Wise Traditions, Weston A. Price Foundation, vol. 5, no. 2, Summer 2004, p. 39.
[183] Leibovitz, B, Safety of amino acids used as dietary supplements, Am J Clin Nutr. 1993 Jun;57(6):944-6.
[184] Executive summary from the report: analysis of adverse reactions to monosodium glutamate (MSG), J Nutr. 1995 Nov;125(11):2891S-2906S.
[185] Earles, Jim, "Sugar-Free Blues," Wise Traditions, Weston A. Price Foundation, vol. 4, no. 4, Winter 2003, p. 21.
[186] www.eatright.org/Public/GovernmentAffairs/92_adap0598.cfm.
[187] *Ibid*
[188] www.fda.gov/bbs/topics/ANSWERS/2002/ANS01156.html
[189] Alternative Sweeteners, Third Edition. Lyn O'Brien Nabors (editor)
[190] www.ecit.emory.edu/ECIT/chem_ram/synth/Hodgin.htm
[191] www.gnc.com/health_notes/Food_Guide/Non_Nutritive_Artificial_Sweeteners.htm
[192] www.eatright.org/Public/GovernmentAffairs/92_adap0598.cfm
[193] http://presidiotex.com/bressler/
[194] Food Magazine , Vol 1 No.9, April/June 1990. (England).
[195] http://presidiotex.com/bressler/
[196] Blaylock, *The Taste That Kills.*
[197] Roberts, H.J. MD, Natural Foods and Farming, Mar/Apr 1992, pp. 23-24.
[198] Fallon, Sally and Enig, Mary G, PhD, *Nourishing Traditions*, NewTrends Publishing, 2001, Washington, DC.
[199] www.aspartamekills.com/lydon.htm
[200] www.aspartamekills.com
[201] www.aspartamekills.com/lydon.htm
[202] www.cfsan.fda.gov/~dms/fdsugar.html
[203] www.aspartamekills.com/lydon.htm
[204] www.holisticmed.com/aspartame/summary.html
[205] U. S. Department of Health and Human Services, "Symptoms Attributed to Aspartame in Complaints Submitted to the FDA," April 20, 1995 and http://aspartametruth.com/92symptoms.html.
[206] www.karinya.com/neotame.htm